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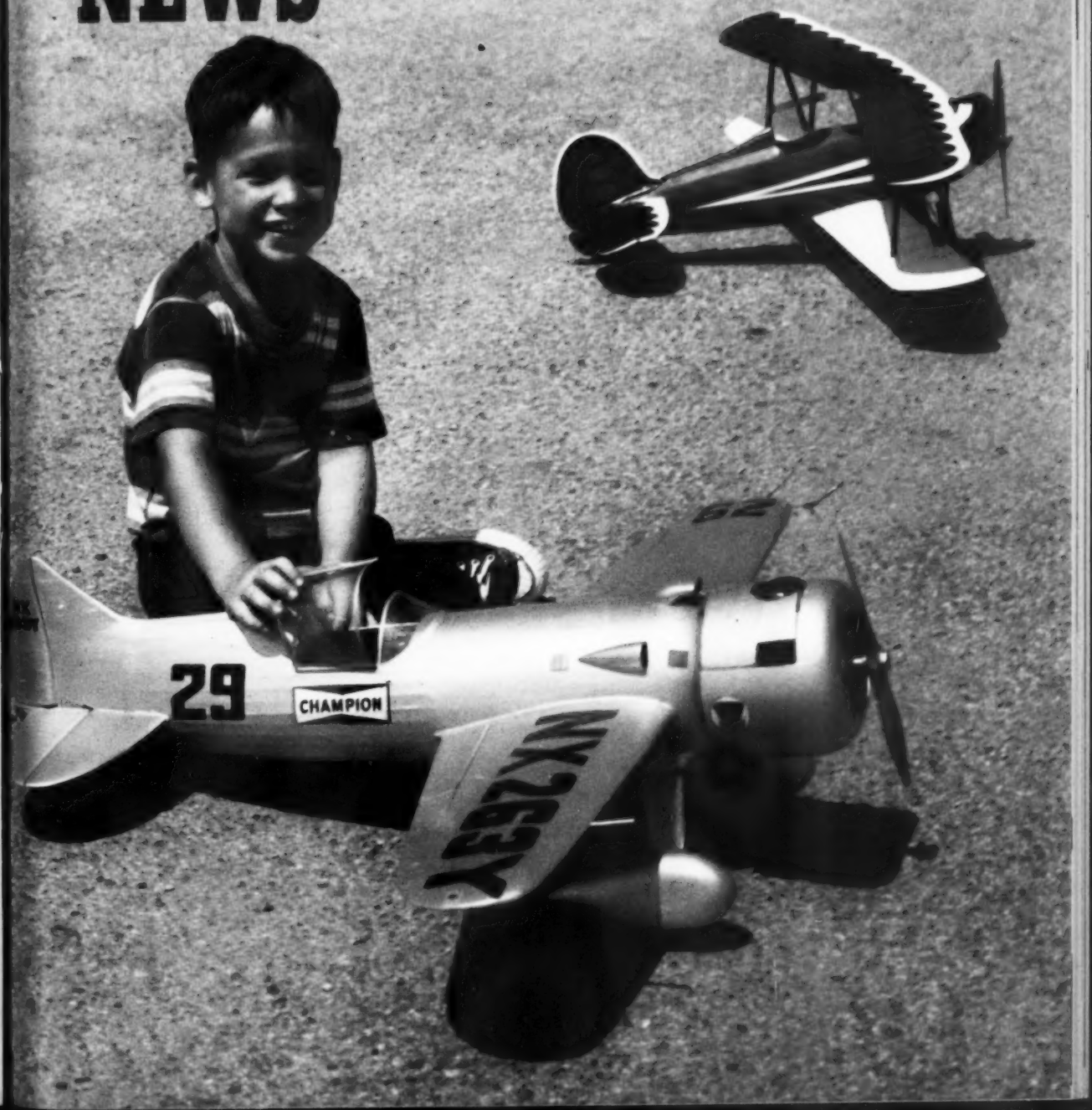
January 1959—35 cents



1958 NATIONALS WINNER

TORPEDO ENGINES • LED THE FIELD IN THE NUMBER OF **FIRST PLACES**

TORPEDO ENGINES • LED THE FIELD IN THE NUMBER OF **SECOND PLACES**

TORPEDO ENGINES • LED THE FIELD IN THE NUMBER OF **THIRD PLACES**

	Torpedo	Engine "A"	Engine "B"	Engine "C"	Engine "D"	Engine "E"	Engine "F"
FIRSTS	14	9	6	4	2	1	1
SECONDS	16	6	6	3	4	6	0
THIRDS	12	10	8	2	2	2	1
TOTAL IN TOP 3*	42	25	20	9	8	9	2

For the NINTH CONSECUTIVE YEAR, TORPEDO ENGINES led the Nationals, by winning **more first places** than **any other** engine. Surely this consistency is definite proof that Torpedo engines are the champions! There is a Torpedo engine for every type of flying—and each a champion—so power your next model with the engine that does everything other engines **claim to do!**

FIRST PLACE WINNERS

Niki Burt, New Orleans, La.
Strether Smith, Ithaca, N. Y.
Vic Cunnyngham, Baldwin Park, Calif.
Dick Lindy, Cuyahoga Falls, Ohio
Charles E. Diller, Riverside, Calif.
Bill Hunter (2), Sun Valley, Calif.
David Edmonson, Minneapolis, Minn.
Gary Duncan, Van Nuys, Calif.
Ray LaHood, Omaha, Nebr.
Charles Gilliland, Tulsa, Okla.
Richard Taylor, McCoy AFB, Fla.
Bob Dunham, Norwalk, Calif.
Team: Morton & Gregg, Dallas, Texas

SECOND PLACE WINNERS

Edward Pilkington, Hialeah, Fla.
Herbert Swanson, De Plaines, Ill.
Michael Burke, Louisville, Ky.
Charles E. Reck, Danville, Ill.
C. O. Schuchmann, Belleville, Ill.
Arnold L. Nelson, Long Beach, Calif.
Frank Parmenter, Hampton, Va.
Charles Robert, Flint, Mich.
Howard Bonner, Los Angeles, Calif.
Robert Wischer, Delafield, Wis.
Duane Kaasa, Seattle, Wash.
Joe Thompson, Milwaukee, Wis.
Ruby Kuiber, Cleveland, Ohio
C. O. Wright, Topeka, Kan.
Ralph N. Jackson, Vestal, N. Y.
Lawrence H. Conover, Cedar Rapids, Iowa

THIRD PLACE WINNERS

Don Hoyer, Dayton, Ohio
Larry Miller, Cleveland, Ohio
Vic Cunnyngham, Baldwin Park, Calif.
John E. Revello, Dearborn, Mich.
Bill Wisnieski, Lakewood, Calif.
Ken McClenahan, Englewood, Colo.
Gerald Ritz, Des Plaines, Ill.
Howard T. Bonner, Los Angeles, Calif.
Tommy Stinson, Ruston, La.
Ronnie Schuler, Canton, Ohio
Bill Deans, Downey, Calif.
Richard Tremps, Anderson, Ind.

SUPERSONIC FUEL AGAIN LED THE NATIONALS BY WINNING MORE FIRST PLACES THAN ANY OTHER TWO NAME BRANDS COMBINED

	Supersonic	Engine "A"	Engine "B"	Engine "C"	Engine "D"	Engine "E"	Engine "F"
FIRSTS	14	7	6	5	5	2	0
SECONDS	7	1	12	7	3	3	9
THIRDS	12	3	4	6	1	3	5
TOTAL IN TOP 3*	33	11	22	18	9	8	14

SUPERSONIC . . . the "WINNINGEST" Fuel of them all! For the best performance—in all types of flying—be sure to use SUPERSONIC, the proven fuel!

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Charles Gilliland, Tulsa, Okla.
David Edmonson, Minneapolis, Minn.
Max Boal, Kansas City, Mo.
Ray LaHood, Omaha, Nebr.
Ed Christenson (2), Lawrence, Kans.
Karl Spielmaker, Grand Rapids, Mich.
Tom Dean, Corpus Christi, Tex.
Charles E. Diller, Riverside, Calif.
Vic Cunnyngham, Baldwin Park, Calif.
Bob Dunham, Norwalk, Calif.
Ed Miller (2), Armona, Calif.

SECOND PLACE WINNERS

Lewis McFarland, N. Charleston, S. C.
Bob Sutton, Phoenix, Ariz.
C. O. Wright, Topeka, Kans.
Harold F. DeBolt, Williamsville, N. Y.
Charles Robert, Flint, Mich.
Burt Ballentine, N. Hollywood, Calif.
Howard Bonner, Los Angeles, Calif.

THIRD PLACE WINNERS

Tommy Stinson, Ruston, La.
Robert O. Hayes, Flint, Mich.
Richard Tremps, Anderson, Ind.
Bill Deans, Downey, Calif.
Donald Stevens, Lemay, Mo.
Ronnie Schuler, Canton, Ohio
Frank Parmenter, Hampton, Va.
John E. Revello, Dearborn, Mich.
Ed Christenson, Lawrence, Kan.
Vic Cunnyngham, Baldwin Park, Calif.
C. O. Wright, Topeka, Kan.
Howard T. Bonner, Los Angeles, Calif.

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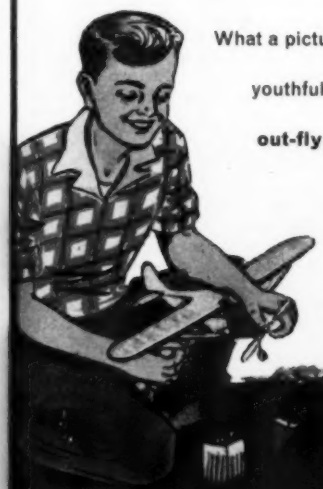

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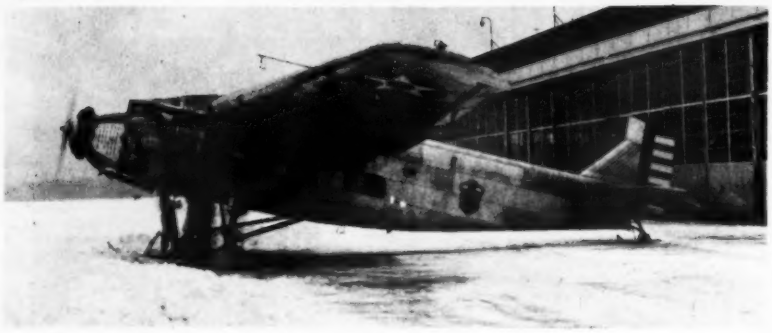

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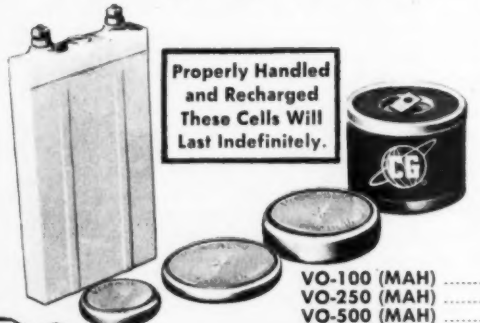

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Foreign Notes

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GREAT BRITAIN

The First Model Aircraft Exhibition previously announced in our July issue which was held in London's New Horticultural Hall, Westminster, August 20-30 proved very successful and the organizers (British Model Aircraft magazine) are already making plans for a bigger and better show for 1959. The exhibition had something of everything: static displays, trade stands, flying demonstrations and a competition section.

U-control flying was demonstrated inside a special cage, using remote control via a center pylon with control-stick outside the circle. Models were semi-scale types powered by Frog .06 and .09 Diesels. Free-flight type models were also flown, tethered to a long, vertical wire stretching way up into the high roof of the hall. Static exhibits included every type and size of model, from a 10 ft. RC Aeronca Sedan downwards, a full-size S.E.5A W.W. I fighter, a full-size sailplane and 104 engines from your reporter's collection of American, British and foreign model motors.

RUSSIA

Top Russian model flier, Ivan Ivannikov, who specializes, with considerable success, in the seemingly unlikely combination of rubber models and very fast pulse-jets, has a new Wakefield of more than usual interest. Spanning only 40 in., with a length of 44 in., it has a prop of over 25 in. diameter and of highly unorthodox design. This features small blades mounted on long wire stems, so that only the outer half of the prop radius, (by far the most effective half), is used to produce thrust, while the torque absorption of the inner half is appreciably reduced. The model features a fairly low aspect ratio wing, which is of rectangular planform with square tips and a chord of nearly six in. Airfoil section is of a laminar flow type with maximum thickness at 50 percent and deep undercamber toward the trailing edge. Tip dihedral is used, with a long, flat center section and only the outer five in. of each panel upturned. The fuselage features a monocoque front end, basically an octagonal section structure, with balsa filling between the stringers, the whole then being sanded to a circular cross-section. This gives way to a built-up diamond section framework at the rear. Sixteen strands of Italian Pirelli 6 x 1 mm. flat rubber is used for power.

Recently we were able to inspect, also from Russia, an MK-16K Diesel motor. This, one of the latest in the line of MK model engines designed by the noted Russian modeler, Vladimir Petukov, is a .06 cu. in., disk induction, twin ball bearing motor. It has a similar porting layout to that of the earlier MK-12 engine described in the October '58 MAN, but is a much neater design. An unusual feature of the MK-16K is the provision of three annular lubricating grooves on the piston, two above the wrist-pin and one below. Measured bore and stroke of the example examined was 0.507 x 0.472 in. The engine weighed 3¾ oz.

DENMARK

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(*Continued on page* 51)

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30th Year of Publication

MODEL AIRPLANE NEWS

M.A.N.

JAY P. CLEVELAND, President and Publisher

January 1959 Vol. LX, No. 1

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Executive and Editorial Office: 551 Fifth Avenue, New York 17, N. Y.

Advertising Manager, N. E. Slane, 551 5th Ave. New York 17; West Coast Adv. Mgr., Justin Hannon, 4708 Crenshaw Blvd. Los Angeles 43, Calif.

Published Monthly by Air Age, Inc. Editorial and Business Offices: 551 Fifth Ave., New York 17, N.Y. Jay P. Cleveland, President; Y. P. Johnson, Vice Pres.; Louis V. DeFrancesco, Treas.; G. E. DeFrancesco, Sec. Second Class Postage paid at Columbia, Missouri. Additional Second Class Entry at New York, N.Y.

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by William Winter

► Battle scarred veteran of border incidents, MAN at Work "views with alarm" the sticky protests under the Builder of Model, Rule 1:18, of the Official Model Aircraft Regulations. It is the law, son, that "every Contest Director shall make every reasonable effort to assure himself that each flier has completely constructed the model (s) he uses in competition, including the covering" and so on. . . .

If a father supposedly builds a model for junior, and then junior wins a contest against other kids who did it the hard, or honest way, there are squawks to AMA in Washington. These appeals to the Supreme Court are inevitable because few contest directors would brand any father-son competitors as hoss thieves. Them's shooting words and you'd need an insurance investigator hiding behind the oil burner to sneak incriminating pictures of the boys at work. So there is never any proof —and something will go out of life if we ever see any.

If junior is a neat builder and a good flier, he may get the old man hung, even if that Open Class character is as clean as a hound's tooth. Junior may come up with a job that could win the Nats but if he prangs it no one cares whether he or the old man made it. The distinction is neat. He just shouldn't take home the hardware. Reminds us of the time Chet Lanzo entered an RC glider in towline. Did they laugh! But in the pm, he snagged a thermal and placed. Such protests!

Since the rule is not enforceable, one faction wants it killed. This would legalize the very thing the present rule seeks to avoid—pa making the crates for sonny. This line of reasoning suggests that the next step would be to abolish junior competition because of the bloodshed on the contest fields of the future. By such principles, civilization would have to abolish all laws because some people break the law. The rule must stand.

How much help can pa give Joey? In our house, Joey, if left to himself, would cut a ⅛ inch gusset plumb in the middle of our best four-inch sheet balsa. Joey must have help and advice for, otherwise, how can dad and boy share model building? An expert father who seeks to make a "real modeler" out of the kid, sometimes rides hard making the kid cut (*Continued on page* 61)

NEXT MONTH'S COVER Monocoupe

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PLANE ON THE COVER

Five-year-old Eric Haack (flies 1/2A) with Dad's Pesco and a 200-flight Great Lakes (flies inverted, does eight's), helps older brothers, Rudy and Lowell, and father, Robert H. Haack, who made this picture. Mr. Haack, is supervisor of photography at the Southwest Research Institute, San Antonio, Tex. Mr. Haack has a priceless stable of flying scale jobs.

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FREE of extra cost with every **GAS ENGINE** — Bonus items include: Tube of "REV-UP" Lubricant (makes your engine last twice as long!), Ownership Decal, Correct Size Propeller, Big Engine Handbook, Mounting Nuts & Bolts, Numeral & Alphabet Decals, etc., etc. FREE of extra cost.

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RUBBER MODELS

MUSTANG P-51 $12.95 — Comet's all plastic two-tone beauty. Has an OK Cub engine w/parts. Has self starter. 16" wingspan. Deluxe!

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Bulletin Board

Looking for information? The Bulletin Board is the place for notices, ideas, announcements and bulletins, that come in every month. Notes of general interest from model clubs, modeling ideas from individuals, brief mentions of interesting new products from the trade, and so on.

• • •

► The Royal Canadian Air Force, in connection with the 50th anniversary of powered flight in Canada, is sponsoring a National Model Building Contest for Canadian boys 15 to 19 years old. Competition is strictly for scale with each of seven separate areas competing with a different scale job. The RCAF hopes that the winners can be permanently displayed in the National Air Museum.

Winners of first prizes will get an air tour to the United Kingdom and to Canada's No. 1 Air Division in Europe, second and third prizes will be transcontinental flights—flights aboard RCAF aircraft. For information, write R. Wood S/L, RCAF Coordinator, 50th Anniversary Project, Department of National Defense, Ottawa, Ontario—but only if you're a Canadian.

• • •

How do you go about getting a regular model flying site? If you or your club or any other organization in your home town has made successful arrangements for a permanent model flying site, MAN would like to hear how it was done. We're building a file of case histories so that we can pass along successful ideas to other groups. Don't spare the details!

• • •

The first attempt to legislate safety into amateur rocketry is a highly significant ordinance passed by the City Council of Colorado Springs, Colo. It carefully specifies where and how rocket models can be operated, and requires approval of every rocket motor sold. A $5.00 sales license is required of dealers. The National Association of Rocketry prepared the ordinance. The Advisory Council for the Pikes Peak Area is setting up a range and Chairman William S. Roe states to MAN, ". . . will be an excellent solution and will focus attention on models rather than lethal projects."

It is a constructive effort to prevent accidents caused by unsafe rockets and unsafe handling. Fourth of July rockets, however, are not covered. While reciprocating engine model aircraft are specifically exempted, Jetex-type models appear to be included and, if you read the law carefully, it seems that it is illegal for a Jetex-type model to come down unless it's dethermalized.

• • •

► C/o Fleet Post Office, San Francisco, a letter from Gerald E. Tyner AN, USN. A bunch of modelers aboard his ship—which boasts a well-tocked habby shop! Mostly RC and control-line stuff. Fly only in port. Shucks, you'd think they'd at least fly Navy Carrier—they're aboard the U.S.S. Shangri-La . . . *Convairiety* (Convair house organ) shows a lunchtime indoor meet. Only rules: paper covering, rubber loop no longer than eight inches. Where do they hold the meet? Inside the low-speed wind tunnel.

Real hair-raiser from A. E. Rosevear of Montreal: "Flying while a thunderstorm

(*Continued on page* 62)

Radio AHC Control

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Special 1A64 R/C Tubes	2.95	1.79
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R/C MULTITESTOR	$16.95	$12.95
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Super A'trol 13.95 (Assembled)	19.95
Tona Aerotrol (Assembled)	24.95

Receivers—Multi Channel

(2) Babcock BRC-7	69.95
(2) Citizenship R6R	64.95
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RAYTROL (3) Assembled	64.50
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(5) Citi-skip CG T5 Assembled	89.95
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A terrific bargain! This hydro speedboat is 24" long, with an 11" beam. For gas or electric motors or R.C. All prefab. wood & plastic exterior.

DOPE BRUSHES — We made a special purchase and can offer you a real "buy". Assrtd. sizes $3.00 Value
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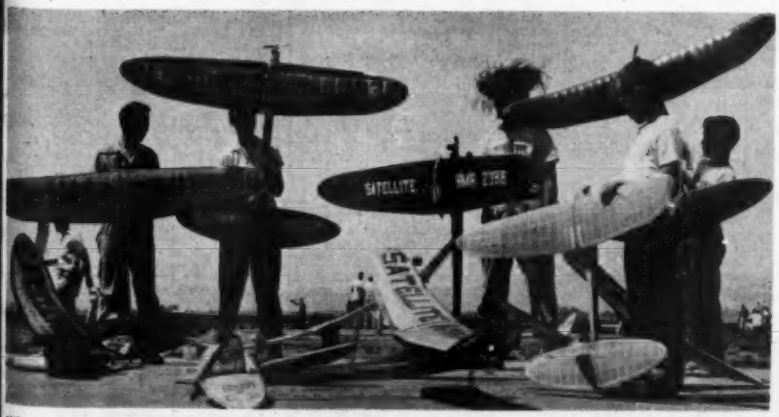
25¢ — 64 page 2-color RAILROAD catalog. HO & TT gauge items, fully illustrated; loads of data, etc.

Getting off Satellite to Nats record, Billy Hunter. Three San Valeers juniors set three Nats records in ROW at the Nats. Also took all but one second place in their event. A pretty ship, too.

Satellite 600!



Where the Satellites come from! A few San Valeer club members on a Sunday morning orbiting session with a few Satellites. Junior members excel because of interest in kids.

by ROBERT R. HUNTER

Undisputed champion—1958. Sensation at the Nationals. Winningest ship in the U.S. Build yourself one of these great airplanes. In all the classes, .049 to .60, they are breath-taking performers.

(Editor's Note—This is the winningest free flight in America today. Prenationals wins were many. It dominated the Nats. As this is written, the Satellite swept first place in B and C at Thunderbugs Annual, Long Beach, Calif., taking high time and junior sweepstakes. The following week, at San Valeers Annual, Van Nuys, Satellites took firsts in A & B Open, first three in Junior, Second C Open, Second Night Flying, and Open Sweepstakes.)

The Satellite was developed shortly after a San Valeers club meeting, early in 1957, during which a sometimes violently worded discussion on the merits, or otherwise, of the class C model took place, and whether it would be advisable to continue such a class in our club competition and open contests. The modeler, whose memory will take him back to sights such as a field swarming with howling Hornets, McCoys, and Doolings on the business end of beautiful Sailplanes, and other such extinct birds, will still have a soft spot for built-up construction, elliptical flying surfaces, under-cambered airfoils, and the terrific glide resulting from such a combination.

In complete agreement with the large area, light-loading, high-power theory, I decided to "go for broke" on the first ship with an Italian Supre Tigre 60 job of over 1,400 sq. in. area. This monster, with a surprisingly fast VTO and climb, won consistently from March through September of '57.

My particular favorite, however is the "600", A-B-C combo, because it is so versatile. The "600" and all others of the line, with the exception of the .02, have racked up many wins at Phoenix, Taft, Tulare, Long Beach, and Los Angeles. The crowning touch came at the 1958 Nationals when three Jr. San Valeers swept the Jr. division, taking all available first places, and all but one second place. Records were established in ¼A, B, and C, for the ROW event.

Satellite is a composite of many models of the past and present, using methods to cut building time and weight, without sacrificing strength or utility, resulting in (*Continued on next page*)

SATELLITE . . . *continued*

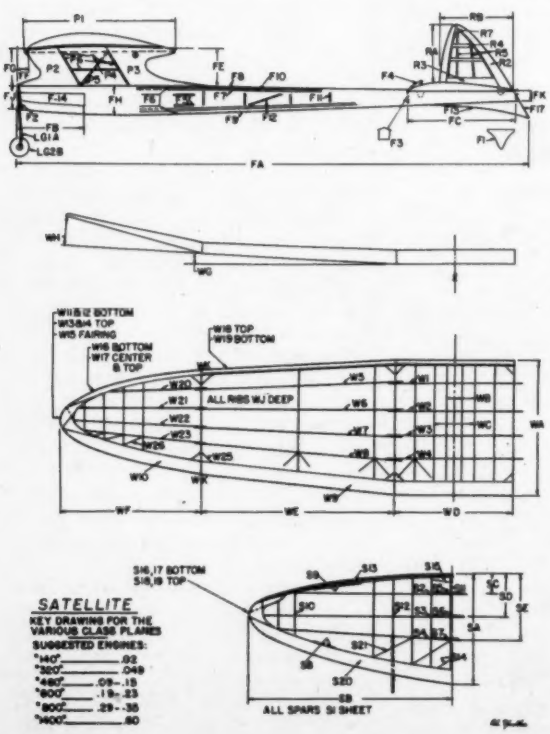
a model of pleasing appearance and ability. Though some methods to gain this end may seem unorthodox, a careful study of the plans and material-dimension key table, will soon show that construction is relatively easy. Slab side versions have been built, using total width and depth dimensions, and performance remains approximately the same.

Sig wood, (contest balsa) has been used throughout for its light weight. Templates for all curved parts except air foils are made with large size, heavy poster board and pencil carbon obtained at stationery stores. Lay out templates for same wood thicknesses together, and pin to corresponding balsa sheet. Stack sheet for number of parts necessary and jigsaw. Rib templates required are one main wing rib and one stabilizer rib template, made of 3-32 plywood or aluminum.

Wings: Flying surfaces are built and covered first to allow curing time for the dope. Laminate tips, notch and laminate leading edge, notch trailing edge and pin all to the plan, noting T.E. (trailing edge) shim, and tip washout shim. This completes outline. Slice bottom ribs, as per plan diagram, marking sheet on the L.E. (leading edge) with a ball-point pen before slicing, so they cannot be reversed when placing in position. Cement in place, making sure that cuts are correct, so that ribs are not forced into L.E. and T.E. notches. Correct length of ribs, at any point on the wing plan, is obtained by placing L.E. of full size sliced rib on reference line. Cut rib now at T.E. & L.E. This applies to any rib in any position, and in this manner the wing will assume the correct rib depth and taper.

Slice top ribs, and four solid center ribs with spar slots.

Easy-to-read tables give dimensions, material sizes for all the classes.



Ever VTO half a horse? Bob Hunter puts up a hot C version—you can figure it from the tables, next page. Note undercambered foil.

Undercut for planking on bottom of all four solid ribs, 1/16", and on top of center two solid ribs, 1/16". This allows for planking depth to make up total rib depth. Cement the four solid ribs in place shimming to allow for bottom planking. Pin top sliced ribs at dihedral breaks and pin end tip ribs in position. Measuring distances between ribs at spar locations gives actual spar depth. Taper is straight between these points. Cut sheet to correct spar length (total), and mark off spar dimensions, reversing dimensions from one end of the sheet to the other, so

DIMENSIONS – INCHES					
MODEL	140	320	460	800	1400
FA	19.2	30	36	48.8	62.5
FB	Mounting Plate			6-1/2	8
FC	4.3	6-3/4	8	10-3/4	14
FD	1-1/8	2-3/4	3-3/4	5-3/8	4
FE	1-3/4	2-3/4	3-1/4	4-1/8	5-5/8
FF	1/2	5/8	7/8	1-1/8	1-5/8
FG	1-13/16	2-3/16	3-1/4	4-1/8	5-11/16
FH	1-1/4	1-9/16	1-3/4	2-3/4	3-3/8
FJ	1-1/8	1-1/4	1-1/2	2-1/4	3
FK	3/8	3/4	3/4	7/8	1-1/8
RA	2-3/4	4-1/4	5	6-1/8	8.9
RB	2-1/4	5	5-1/4	7-3/4	10-1/8
LG1A	3	3	4-1/2	5-1/2	7-1/2
LG2B	–	–	1-1/4	2	2-1/2
WA	5.2	8	9-3/4	13-1/8	17
WB	.8	1.0	1-1/8	1-5/8	2
WC	1.6	2-1/2	3	4-1/8	4
WD	4.8	7	8-5/8	10-1/4	13-1/2
WE	7.6	12	14-1/4	19-1/2	24-1/2
WF	5.4	8-1/2	10-1/8	13-5/8	17-1/2
WG	5/8	1	1-1/8	2	2-1/2
WH	1-1/4	2	2-3/8	4	5
WJ	1/16	3/32	1/8	1/8	5/32
WK	4.2	6-1/2	7-7/8	10-1/2	13-5/8
SPAN	30.6	48	57-1/4	78-1/2	99-1/2

NOTE: SPAR DEPTHS & TAPERS OF ANY WING MAY BE EASILY DETERMINED, AFTER BOTTOM RIBS ARE INSTALLED, BY SETTING ALL TOP DIHEDRAL BREAK RIBS IN PLACE & MEASURING DISTANCE BETWEEN CAPSTRIPS.

SA	4.3	6-3/4	8	10-3/4	14
SB	8.1	12-1/2	15	20	26
SC	.9	1.8	1.8	2.2	2.9
SD				4-1/8	5.4
SE	2.6	4.3	4.8	6.8	8.5
SPAN	16.2	25	30	38	52
SPAR TAPERS:					
FRONT	1/4-1/8	3/8-1/8	15/32-3/16	1/2-5/16	3/4-5/16
CENTER	–	–	–	3/4-5/16	7/8-3/8
REAR	1/4-1/8	3/8-1/8	15/32-3/16	15/32-1/4	1/2-1/4
				-3/8	

S=Sheet MODEL	WOOD SIZES T=Taper 140	320	460	800	1400
F1	1/32 PLY	1/16 PLY	3/32 PLY	3/32 PLY	1/8 PLY
F2	3/32 PLY	3/32 "	3/32 "	3/32 "	3/32 "
F3	–	–	1/8 "	3/32 "	1/8 "
F4	1/16 PLY	1/16 PLY	1/16 "	3/32 "	1/8 "
F5	–	–	3/32 T-3/16	1/8 T-1/2	1/8 T-1/2
F6	–	–	1/16 S	3/32 S	3/32 S
F7	1/16 SQ	1/16 SQ	5/32 SQ	1/4 SQ	5/16 SQ
F8	–	–	1/8 T-3/16	3/16 SQ	1/8 T-1/4
F9	–	–	1/8 T-3/16	3/16 SQ	1/4 T-3/8
F10	–	–	1/8 T-3/16	1/8 T-1/4	1/8 T-1/4
F11	1/16 SQ	1/16 SQ	3/32 SQ	3/16 SQ	1/4 SQ
F12	–	1/16 SQ	3/32 SQ	1/8 T-3/16	1/8 T-1/4
F13	1/16 S	1/16 S	1/16 S	1/16 S	1/16 S

	140	320	460	800	1400
F14	–	–	–	3/32 PLY	3/32 PLY
F15	–	–	1/8 T-3/8	1/8 T-3/8	1/4 T-3/4
F17	Steel Pin	.040 W	1/16 W	1/16 W	3/32 W
R1			3/16 S	1/4 S	1/4 S
R2			3/16 S	1/4 S	1/4 S
R3			1/16 S	1/16 S	1/16 S
R4	1/16 S	3/32 S	1/8 T-1/4	1/8 T-1/4	1/8 T-1/4
R5			1/8 S	1/8 S	1/8 S
R6			1/16 SQ	1/16 T-1/8	1/16 T-1/8
R7			3/16 S	1/4 S	1/4 S
W1					1/4 S
W2					
W3	none	none			
W4				3/16 S	1/4 S
W5-20	1/16 S				3/16 S
W5-21		3/32 S			
W7-22			1/8 S		
W8-23					3/16 S
W9 T	1/8 T-1/2	1/8 T-5/8	3/16 T-3/4	3/16 T-1/4	3/16 T-1/4
W10	1/8 S	1/8 S	3/16 S	1/4 S	1/4 S
W11	3/32 S	3/32 S	1/8 S	3/16 S	1/4 S
W12	3/32 S	3/32 S	1/8 S	3/16 S	1/4 S
W13	3/32 S	3/16 S	1/4 S	1/4 S	1/4 S
W14	3/32 S	3/16 S	1/4 S	1/4 S	1/4 S
W15	–	–	–	1/8 S	1/8 S
W16	1/16 S	1/16 S	1/8 S	3/16 S	3/16 S
W17	1/8 S	3/32 S	3/32 S	3/16 S	3/16 S
W18	1/8 SQ	3/16 SQ	3/16 T-1/4	3/8 SQ	3/8 T-1/2
W19	1/16 T-1/4	1/16 T-3/8	1/16 T-1/2	1/16 T-1/2	3/16 T-3/8
W24	1/16 S	1/16 S	1/16 S	3/32 S	1/8 S
W25	1/16 S	1/16 S	3/32 S	1/8 S	1/8 S
W26	1/8 SQ	1/16 SQ	1/16 SQ	3/32 SQ	3/16 SQ
S1,2,3,4	1/16 S	3/32 S	1/8 S	1/8 S	1/8 S
S5	1/16 S	3/32 S	1/16 PLY	3/16 PLY	3/16 PLY
S6,7	1/16 S	3/32 S	1/8 S	1/8 S	1/8 S
S8	1/16 SQ	1/16 SQ	1/16 SQ	1/8 SQ	1/8 SQ
S9	1/16 SQ	1/16 SQ	1/16 SQ	1/16 T-1/8	1/16 T-1/4
S10	1/32 T-1/8	1/16 T-3/16	1/16 T-1/4	1/16 T-1/4	1/16 T-1/4
S11	–	–	–	3/32 PLY	3/32 PLY
S12	–	–	1/16 S	1/16 S	1/16 S
S13	1/16 T-1/8	1/16 T-3/16	1/16 T-1/4	1/16 T-1/4	1/16 T-3/8
S14	1/16 S	3/32 S	1/8 S	1/8 S	1/8 S
S15	–	–	1/16 PLY	3/32 PLY	1/16 PLY
S16,17	3/32 S	3/32 S	1/8 S	3/16 S	3/16 S
S18,19	1/16 S	1/16 S	3/16 S	3/16 S	1/4 S
S20	3/32 S	1/8 S	3/16 S	3/16 S	1/4 S
S21	1/16 SQ	1/16 SQ	1/16 SQ	3/32 SQ	3/16 SQ
LG1	1/32 W	1/16 W	3/32 W	1/8 W	1/8 W
P1 Pins	1/16 x 3/8	1/16 x 3/4	1/4 x 3/4	1/4 x 1	3/4 x 1
P2, 2 req.	1/8 S	3/16 S	1/4 S	1/4 S	3/8 S
P3, 2 req.	–	–	–	1/4 S	1/4 S
P4	–	–	–	1/8 S	1/8 S
P5	–	–	–	3/16 SQ	1/4 SQ
P6	–	–	–	1/16 x 1/4	1/16 x 1/2

Good finish takes good covering. Hunter uses silk on fuselage, Jap tissue on wing and stab.

Give it four coats, 50-50 dope-thinner, on paper; five on silk. The silk is wet covered.

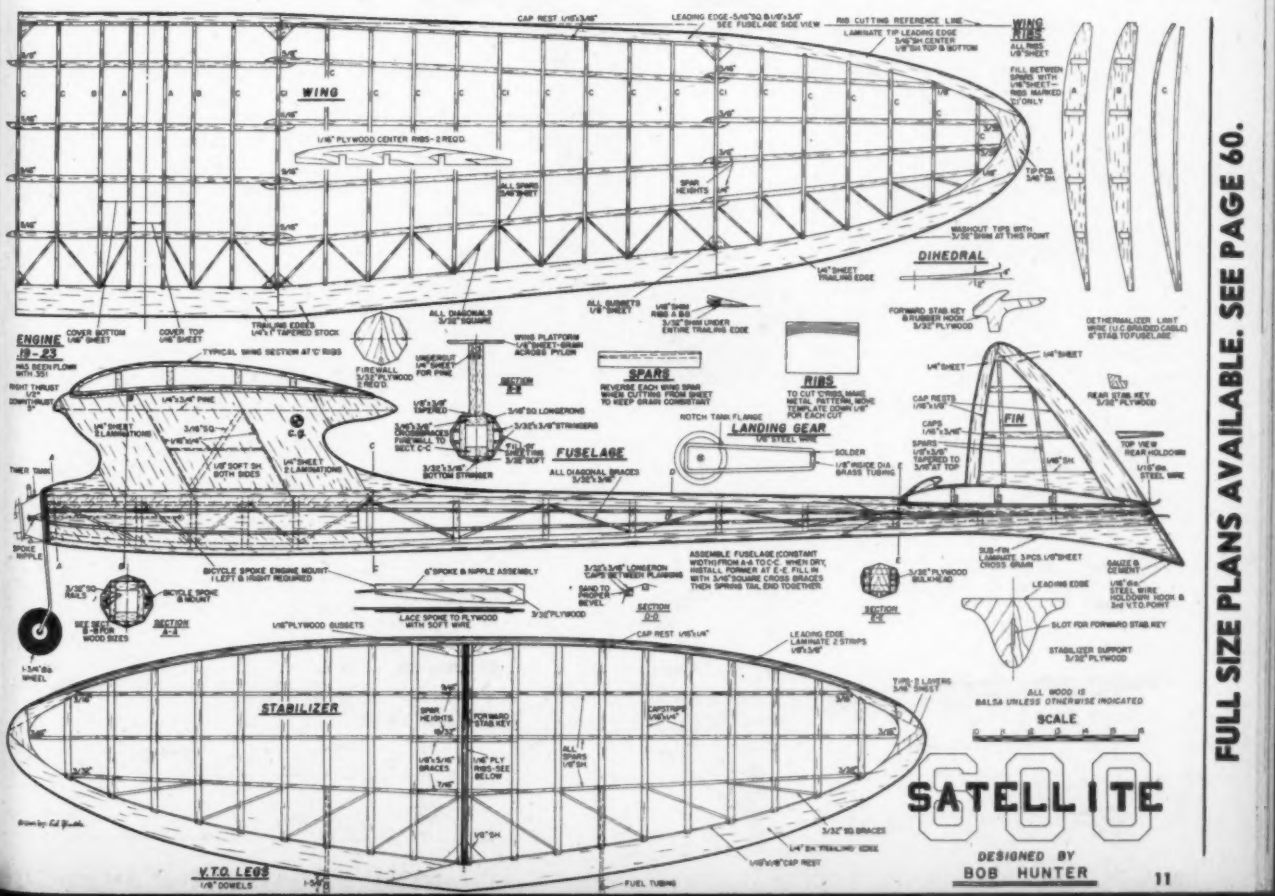
B & B timer tank is used by Hunter on .29-.32-.35. For .19, .23, adapter rings from hobby shop.

that every other cut is parallel with the edge of the sheet. A good straight-edge is essential. Make two each, with exception of center spars. Cement spars in place, and remaining top ribs. Sheet fill all dihedral break ribs and compression ribs. Do not cement dihedral fills until dihedral is installed.

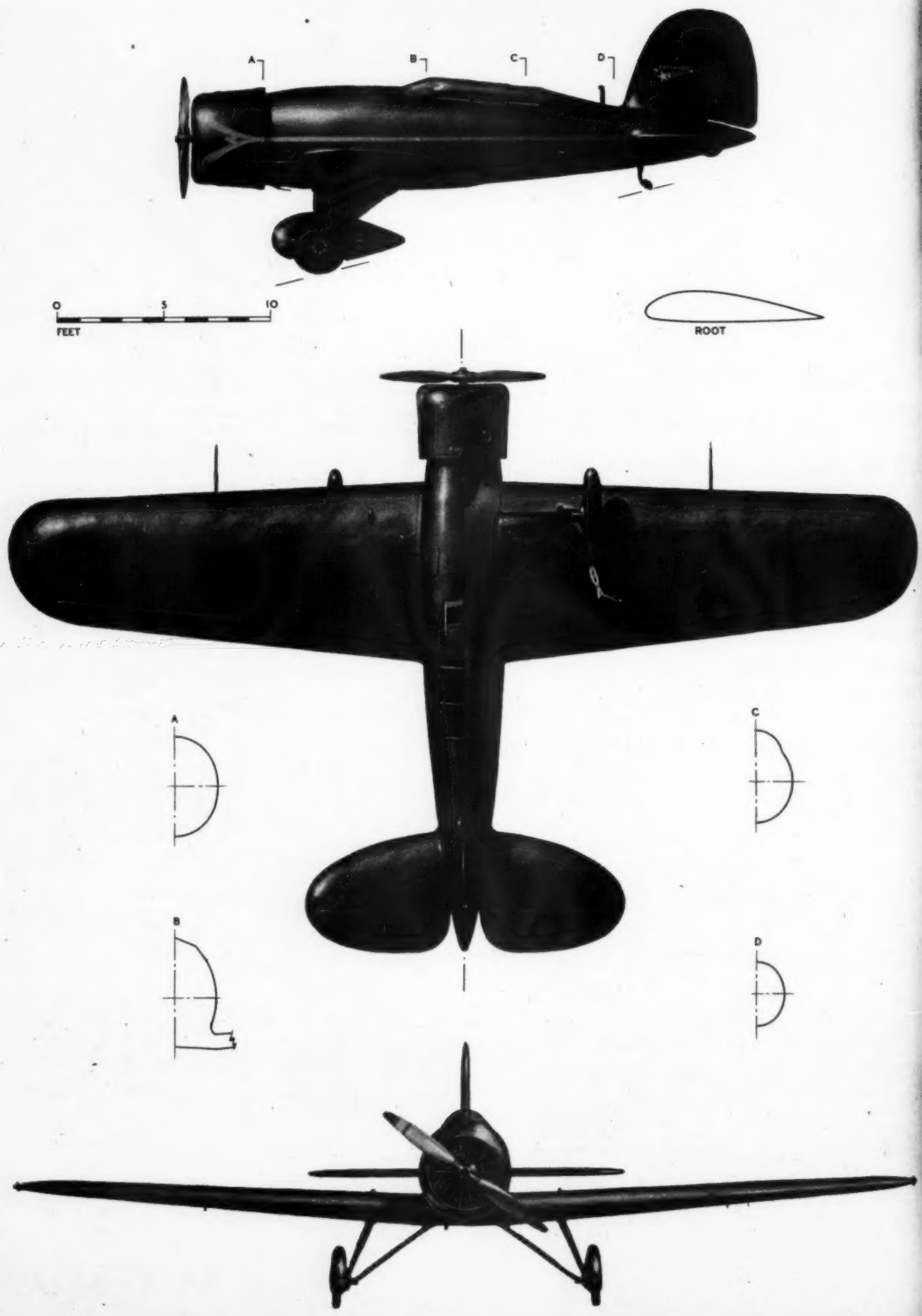
Plank top two center ribs, cement gussets and diagonals. Allow to dry. Bottom may be planked (four center ribs) when structure is removed from plan. Dihedral starting from tips, cement in top ribs and fillers at dihedral joints.

Pre-dope bottom ribs three to five times, cover wing with Japanese tissue, water spray to shrink, and allow to dry. Dope with minimum of four coats of 50/50 dope. Some plasticizer is needed if over five coats are used. If nitrate dope is used, fuelproof center section of wing, top and bottom.

Stabilizer: Laminate tips, notch and splice T.E. and pin in position. Place pins aft side of leading edge line only, laminate L. E. and pin in place starting from center, while still wet. Add bottom cap strips, (*Continued on page* 57)



FULL SIZE PLANS AVAILABLE. SEE PAGE 60.


A
B
C
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10
FEET
ROOT
A
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D

Over 30,000 miles were logged over oceans and bleak wilderness. The Lindbergh's, Clarence Young, Asst. Sec. of Commerce, at air races.

► Charles Lindbergh's epic first solo flight across the Atlantic in 1927 tends to overshadow the rest of a colorful flying career, in particular the far- ranging pioneering flights accomplished with his wife in the ensuing years.

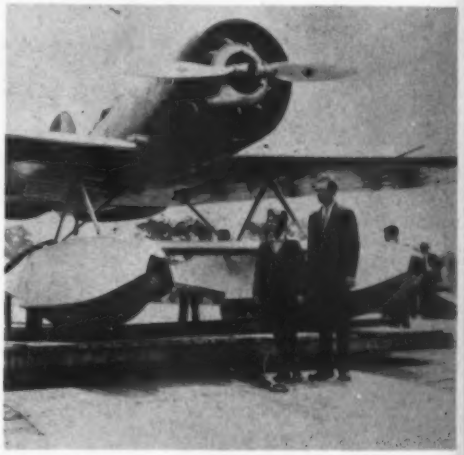
After his triumphant return from Paris he turned down a flood of business offers and opportunities, donations, and propositions of every kind. His first devotion was aviation, and soon he was touring the country in the "Spirit of St. Louis" for the Guggenheim Foundation for the Promotion of Aeronautics, attempting to foster public interest in a bigger civil air program.

Almost immediately after the three month tour, 22,350 miles around the 48 states, he was off again on a 2,100 mile, 27 hr. 10 min., non-stop flight to Mexico City on the invitation of the Mexican president, Plutarcho Calles. After a triumphant reception at Valbuena Field, and Christmas at the home of Dwight W. Morrow, the American ambassador, Lindbergh flew off on a goodwill tour of the Central American Republics, made a spectacular flight across the Andes, a circuit of the islands of the Caribbean, and finally ended his two month odyssey with another remarkable 1,200 mile bad weather trip from Havana to St. Louis.

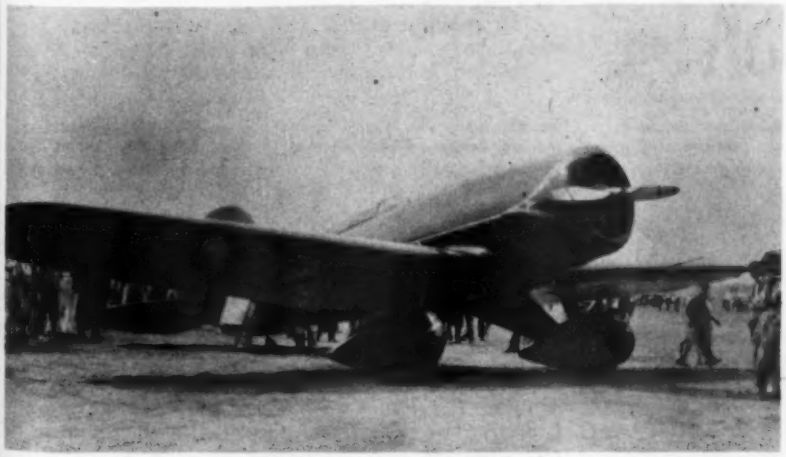
Lindbergh had already met Anne, daughter of Dwight W. Morrow, in New York. During Lindbergh's several visits to Mexico between December 1927 and February 1929, their engagement was announced. Three months later, on May 27th, Col. Lindbergh and Miss Anne Spencer Morrow were married at Englewood, N.J.

The same year, Lindbergh took delivery of one of the first of the new Lockheed Sirius high-speed sport aircraft, and (*Continued on page* 62)

The Lindberghs' Sirius. Using sleek Lockheed float plane, young couple made spectacular survey hops.



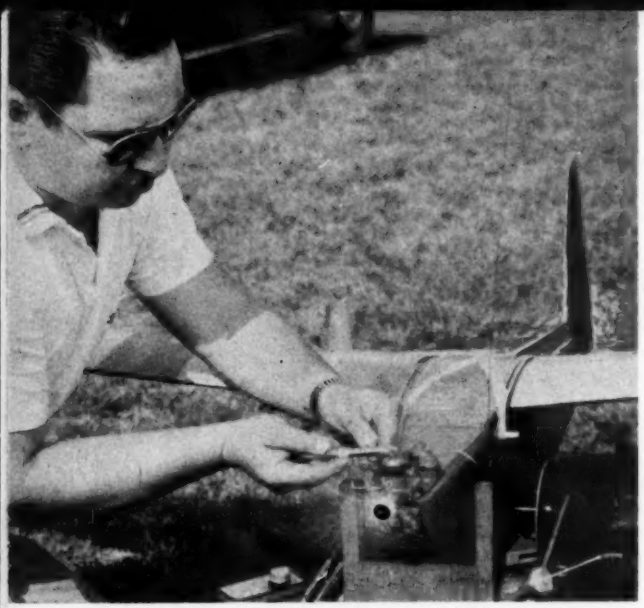
With the Cyclone-powered Sirius, probably at College Point, either before or after '33 hops.



Intermediate Lockheed landplane owned by Lindbergh. Had sliding hoods, cut-down exhausts, Pratt & Whitney Wasp. No spinner. Wheel pants, wide struts add racy appearance.

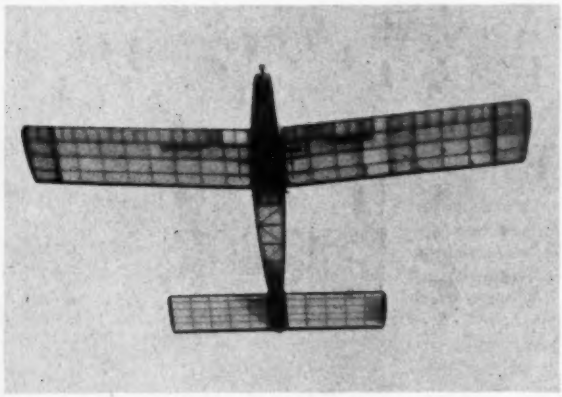
men and ships

by ROY CROSS



Vibra-tac used to adjust engine to 6500 rpm, which gave fuel consumption of approximately 3 ozs./hr., on a nylon 10-6 propeller.

Norm Rosenstock, left, holding one of two test models, editor at transmitter. Seven-foot ships weigh about six pounds when fueled.



Lightly built test job climbs overhead after take-off. Took off with 48 ounces fuel in 480 feet, no wind. Power was .09 Diesel.

dawn to dusk?

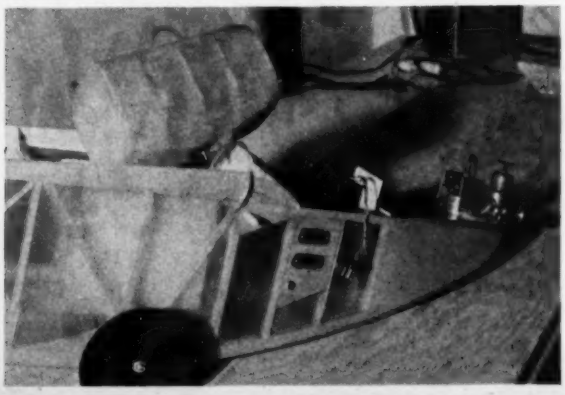
Novel experiments prove it possible to fly an RC model all day—or hundreds of miles. Radio, engine, take-offs, it's all solved. Man himself is the weak link.

(Editor's Note: Endurance flights, real planes or models, are fascinating. Frank Bethwaite, writing in March and April 1957 (The Long Project), presented one of the most talked about modeling reports ever published. The story that follows is a worthy sequel. While it concerns radio control, any modeler will find much thought provoking material on design, ideas and what happens when. . . . With the possibilities demonstrated, it is hoped more attempts at distance and duration will be made.)

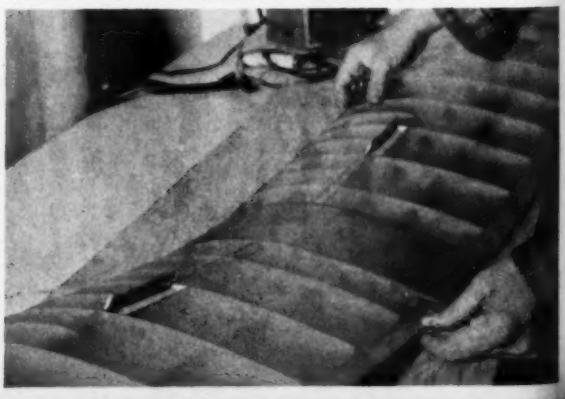
It all began when, over a winter evening coffee, Norm Rosenstock, posed the question, "How long can an RC model fly?" Can any model fly all day without in-flight refueling? Put this way, the radio is simply a means of keeping the airplane nearby and making it land within sight of FAI officials who can testify that the thing really happened.

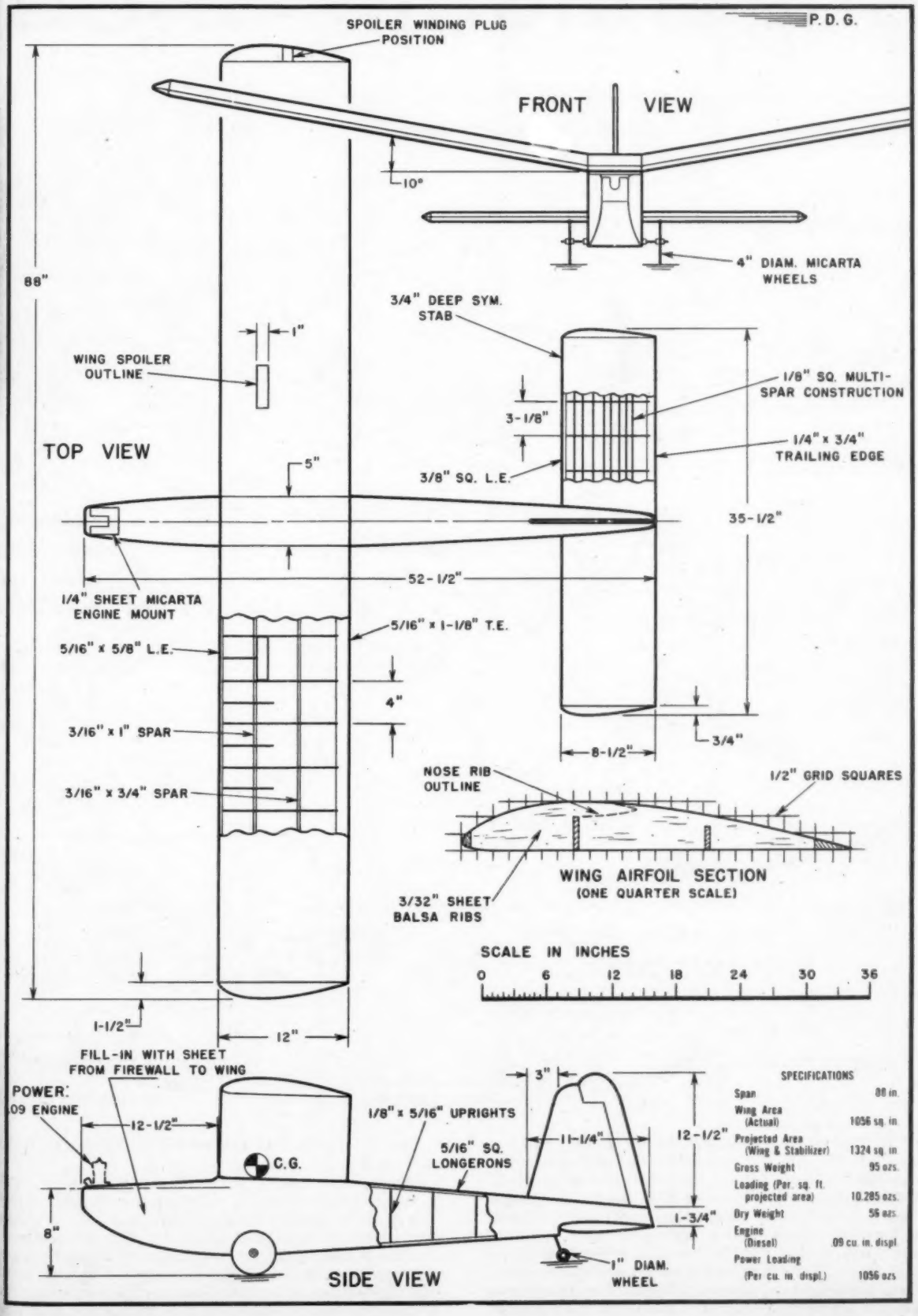
A surprising number of endurance attempts, many successful, have already been made. The power mark for RC stands at better than (*Continued on page* 47)

Left to right—Baffled fibre glass tank, a transistorized single-channel receiver, float chamber for engine. Crankcase pressure used.



Spoilers bring ship down gradually when excessive altitudes are reached. Compound escapement on rudder, SN type for the spoilers.

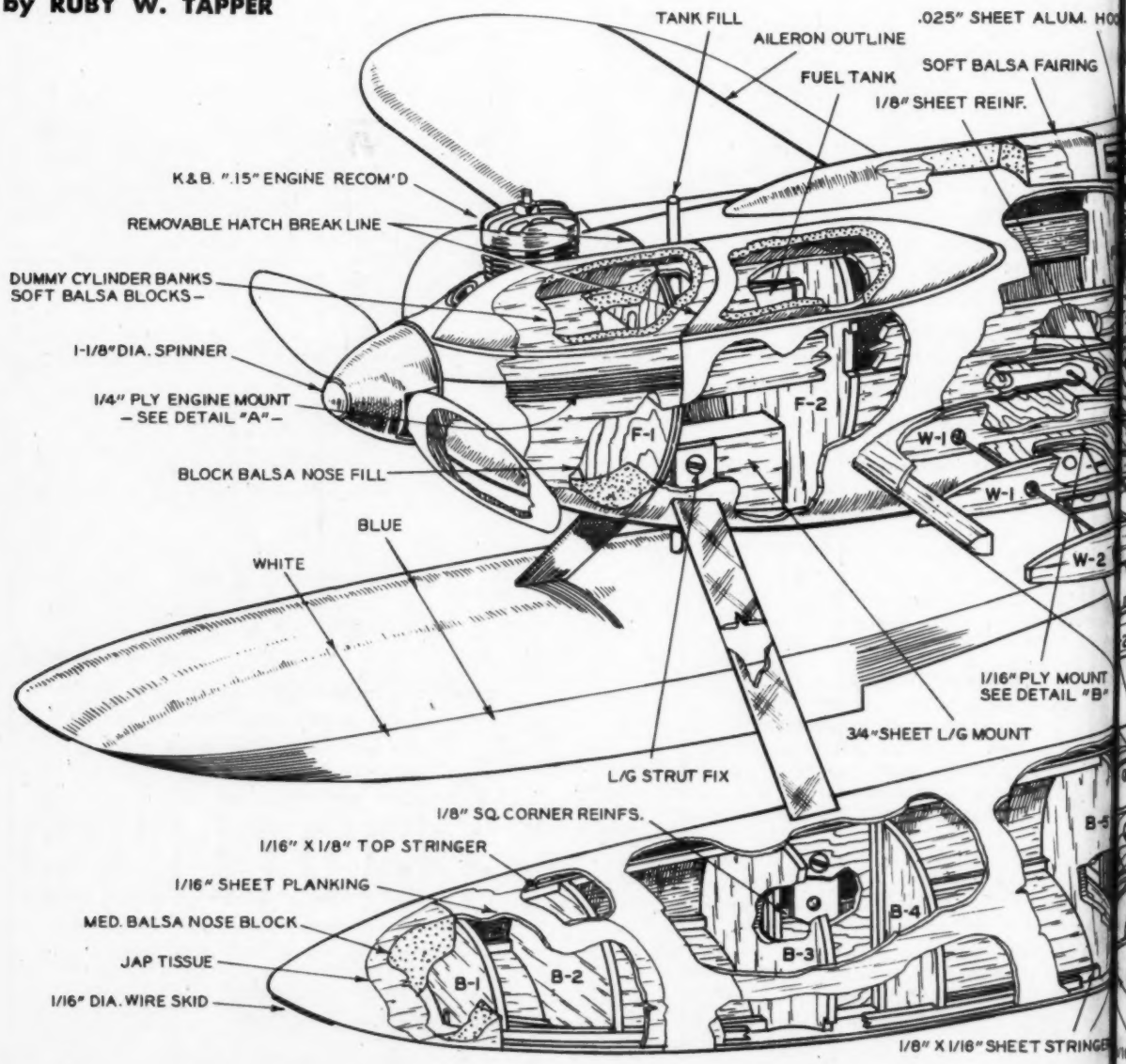



P. D. G.
SPOILER WINDING PLUG POSITION
FRONT VIEW
10°
4" DIAM. MICARTA WHEELS
88"
3/4" DEEP SYM. STAB
1"
WING SPOILER OUTLINE
1/8" SQ. MULTI-SPAR CONSTRUCTION
3-1/8"
1/4" x 3/4" TRAILING EDGE
TOP VIEW
5"
3/8" SQ. L.E.
35-1/2"
52-1/2"
1/4" SHEET MICARTA ENGINE MOUNT
5/16" x 1-1/8" T.E.
5/16" x 5/8" L.E.
4"
3/16" x 1" SPAR
3/16" x 3/4" SPAR
8-1/2"
3/4"
NOSE RIB OUTLINE
1/2" GRID SQUARES
WING AIRFOIL SECTION
(ONE QUARTER SCALE)
3/32" SHEET BALSA RIBS
SCALE IN INCHES
0 6 12 18 24 30 36
1-1/2"
12"
FILL-IN WITH SHEET FROM FIREWALL TO WING
POWER: .09 ENGINE
12-1/2"
C.G.
1/8" x 5/16" UPRIGHTS
5/16" SQ. LONGERONS
3"
11-1/4"
12-1/2"
1-3/4"
8"
1" DIAM. WHEEL
SIDE VIEW
SPECIFICATIONS
Span 88 in.
Wing Area (Actual) 1056 sq. in.
Projected Area (Wing & Stabilizer) 1324 sq. in.
Gross Weight 95 ozs.
Loading (Per. sq. ft. projected area) 10.285 ozs.
Dry Weight 56 ozs.
Engine (Diesel) .09 cu. in. displ.
Power Loading (Per cu. in. displ.) 1056 ozs.

Supermarine S-6B

One of the greatest, possibly the most beautiful racing plane ever built, makes a terrific rise-off-water controlliner for .09 to .19.

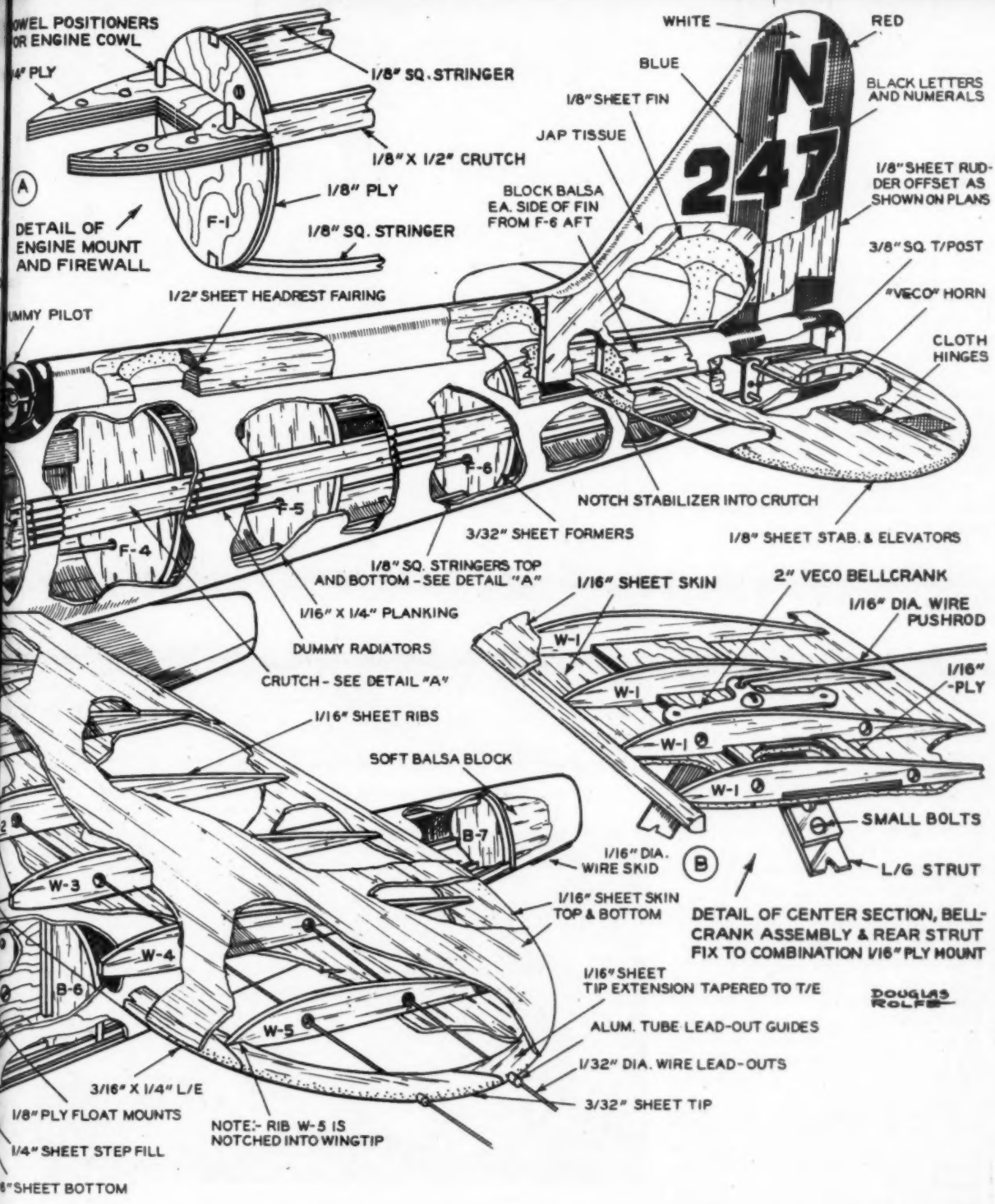
by RUBY W. TAPPER



► The Supermarine S-6B, built by the British was first flown July 29, 1931. On September 13, 1931, it won the Schneider Trophy outright (third British win) at 340 mph. The same day this airplane flew 379.05 mph. The engine was a Rolls Royce of 2300 hp. Later they installed a 2550 hp engine and made a record flight of 408 mph.

It is lots of fun to fly the model. It takes off in about 15 to 20 feet. I installed a K&B .09 with throttle control—closed exhaust port plus venturi flapper. The throttle was operated by air tube to pilot. This engine has plenty of power for take-off. This airplane will fly slowly or 50 to 60 miles an hour.

Wing: Construction is somewhat similar to the AJ Fireball. The wing is all wood, consisting of a top and bottom skin of 1/16" sheet balsa and 1/16" sheet ribs. Butt join two lengths of sheet balsa for the top skin, and two more for the bottom. Trim the lower skin blank to the exact outline shown on the plans; trim the top skin with about an ⅛" overhang all around. The upper skin can be more exactly trimmed as you trial fit it in place on the otherwise



assembled wing.

The wing is built flat on the bench but note that the under surface slopes up toward the leading edge. Slide a long piece of 1/16" x 1/4" under the lower skin, just beneath the leading edge, thus holding it up in the proper position. Cement 3/16" square leading edge and tip filler pieces (3/32" and 1/16" thick) in place on the bottom skin. Install the plywood bellcrank mount and the bellcrank. While cementing the ribs in position, make sure the leadout holes are properly located. There is no trailing edge piece—the top and bottom skins are featherd slightly (side view) to make a good seam.

Take the wing from the bench and, with your razor, taper the leading edge and tip filler pieces, then carefully sand them to the proper mating angles for the top skin. Feather the trailing edge part of the skin where it will meet the top skin. Match the top skin blank, by trimming as necessary with razor and sand paper.

Install the leadouts before closing in the wing. The rear float bracket bolts to (*Continued on next page*)

the wing bottom before the top skin is installed. Be sure the boltheads clear the bellcrank—file down if necessary, or bend up bellcrank slightly or adjust its spacing with washers. Patterns are given for all the .051 inch thick dural brackets. Now put the lower part of the wing back on the bench and cement the top skin in position. The fast worker may handle this as one operation, but it would be better to start the leading edge, placing cement all along that edge, and well back on the ribs, pinning the skin to it, then, finally, cement and pin the trailing edge together. The tip section may be moistened if necessary when closing in the tip. Another way of making the tip would be to use soft sheet balsa, cut to outline (from last rib out), shaped, and cemented to the last rib. Note the cutout hole for the pushrod. If necessary, cut out skin to clear bellcrank.

To finish the wing, carefully sand round the leading and tip edges, and barely touch up the trailing edge.

Fuselage: The bulkheads are cut to shape from 1/8" sheet balsa (F-1 is 1/8" ply) and are cemented in place between the two long crutch members of 1/8" x 1/2" hard balsa. Top and bottom stringers (on center line) are 1/8" square and serve to align the bulkheads preparatory to covering fuselage with its thin balsa skin—skin is "planking" of 1/16" x 1/4" balsa strips. The 3/8" wide sternport butts against the ends of the crutch pieces. Assembly is easier if the crutch pieces are attached to bulkheads 1, 2, 3 first, then pulled together at the stern post, after which bulkheads 4, 5 and 6 are inserted. A filler piece of 1/8" sheet goes above the wing position, on each side of the fuselage, butting against the crutch piece.

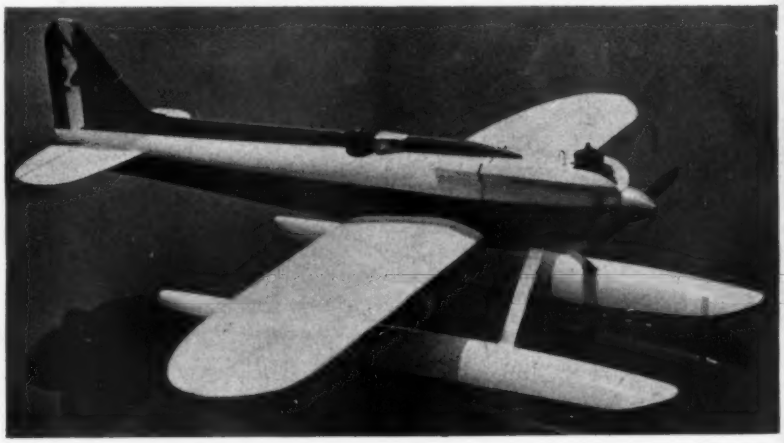
The lower cowl block and the motor mount plate are fitted after planking is done, to make sure they match the true outer contours of the fuselage surface. The wing, with the real float strut bracket attached, is now positioned. After attaching the front float bracket to float mounting block, cement the block in place between bulkheads F-1 and F-2.

Before planking, install the wing. Note that former F-3 is in two pieces; the lower piece of this former, and the bottom stringer between F-2 and F-4 may have to be removed for the operation, then put back in place after the wing is cemented in position.

Fit a 3/4 ounce capacity tank between F-1 and F-2, attaching neoprene drain and fill tubes. Block in tank with scraps of balsa cemented to framework.

Note that it will be necessary to make and install the stabilizer before planking, in order to install the pushrod of 1/16" music wire. Holes drilled in bulkheads can be used as fairleads to prevent bowing of the rod under load.

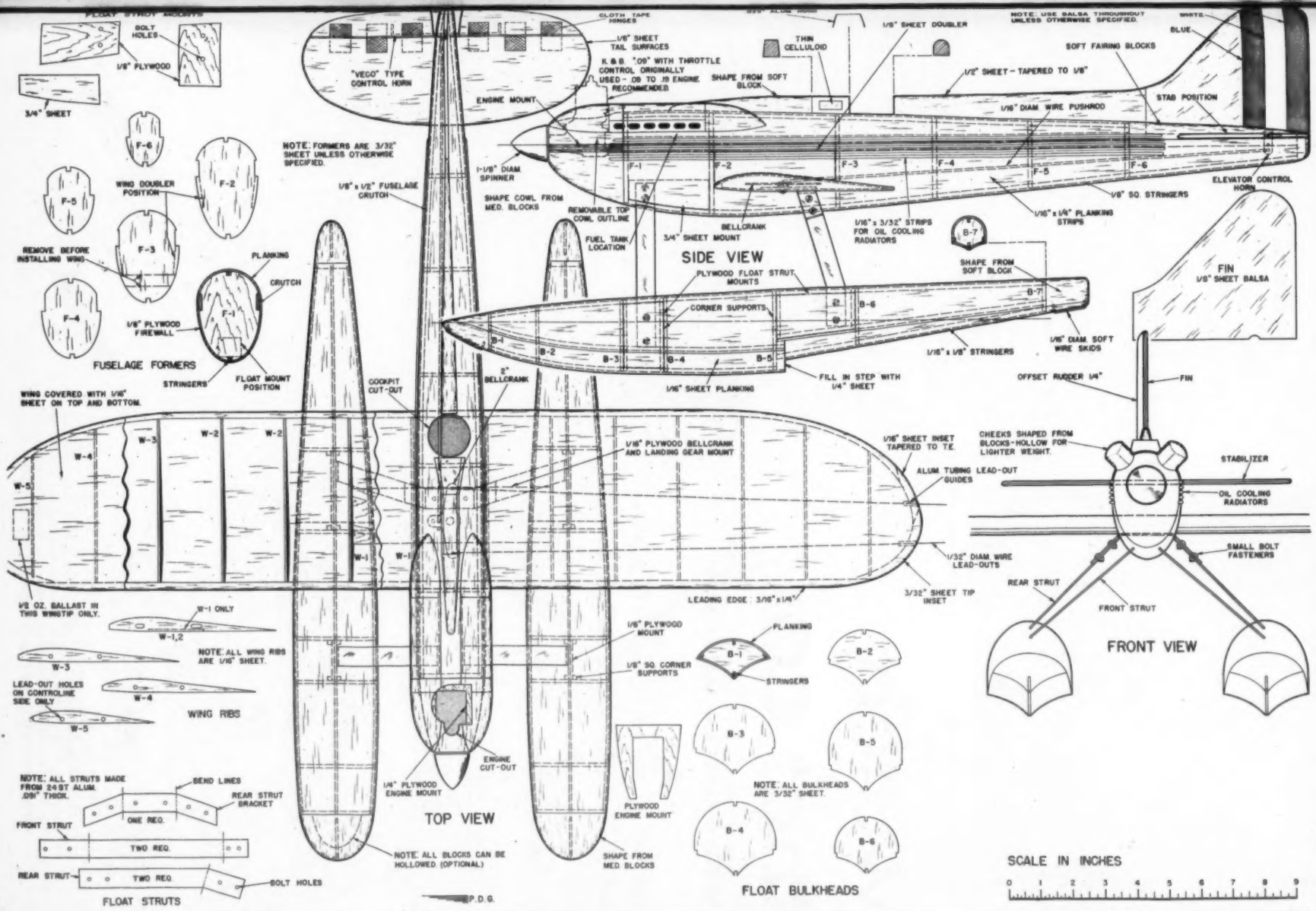
Well-pleased designer with his oft-flown S-6B. Ship is one of many Schneider Trophy racing models flown by FAST club, indoors and out.



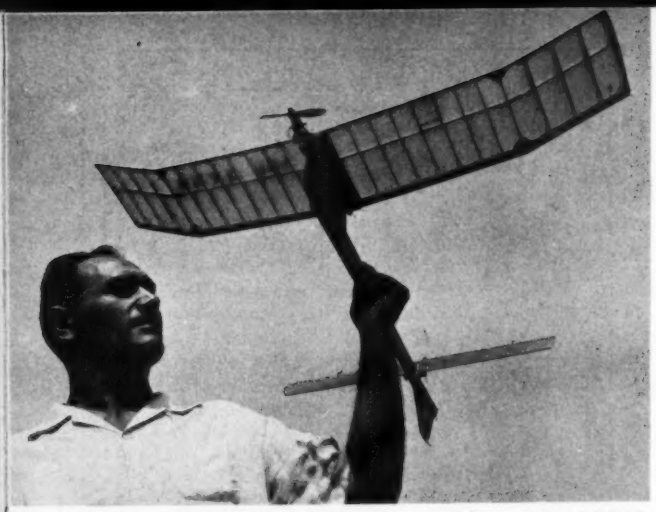
To plank, attach one 1/16" x 1/4" strip to each side of the fuselage on top of the crutch piece, then, one by one, add additional strips, side by side. Work both sides of the fuselage simultaneously; when adding one strip on one side, add the corresponding strip on the other. Eventually, it will be necessary to taper the ends of some of the planking strips to fit together.

Carve lower cowl block and cement against F-1. Cut out horseshoe shaped 1/4" thick motor mount plywood plate. Drill properly spaced engine mounting holes and locate 4-40 blind nuts under plate, then cement plate on top of cowl block. Carve and locate the top cowl block. Fuel proof inside of nose compartment.

The tail surfaces are cut from firm 1/8" sheet balsa, sanded, and the edges slightly (*Continued on page* 50)



FULL SIZE PLANS AVAILABLE. SEE PAGE 60.



Hotshots like Sal Taibi know from long experience about debil CG.

watch that CG!

by BILL BOGART and BUD RHODES

Since W. F. McCombs proved in September 1957 MAN that best climb comes at only one center-of-gravity position, the fur has been flying. So here we go again.

EVER since W. F. McCombs article "For Higher Climb," in September 1957 MAN, there has been a lot of pro-and-con discussion about his recommendations. (Editor–McCombs demonstrated that the position of the Center of Gravity relative to the wing chord, determined best climb.) This article will attempt to remove some of the mystery.

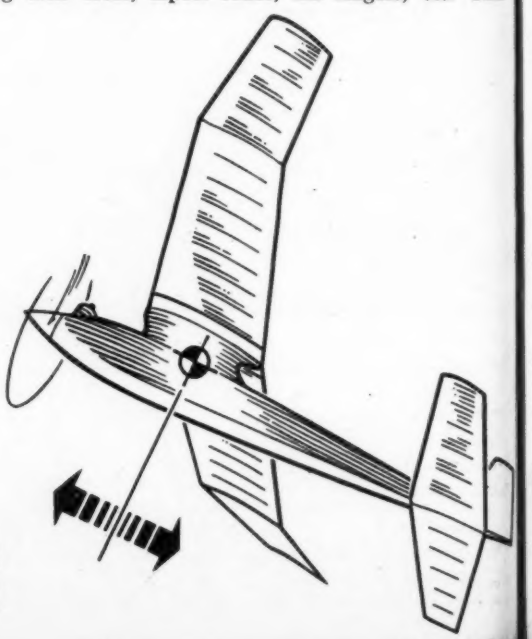
For years we've kicked around the same subjects as other modelers: airfoils, flat vs. undercambered; tail size and length; pylon height, aspect ratio, wing loading, engines, props, etc. A little research will show that numerous combinations of all these factors have proved out as successful free-flight models.

Ships such as the Zipper, Sailplane, Zeek, and Civy Boy, featuring high pylon and undercamber have been successful. On the flat-bottomed airfoil side there are the Ramrod, Hogan, and Spacer, to name a few. Thus, there are inconclusive arguments for a particular airfoil.

Consider tail size. The Civy Boy uses a 50% tail whereas the Spacer tail area is only 30% of the wing area. Most of the successful free flight models fall within this 30-50% band, with no particular area seeming best. Tail length seems to vary from the short length on the Spacer to the long tail length on the Civy Boy. No clue here. Pylon height? No clues here either for Stan Hill's high thrust line ships are as stable as the high pylons during the climb. Aspect ratio? Most of the successful ships have aspect ratios falling in a band between six and eight. As to wing loading, it is generally concluded that, for a given weight, the larger the wing, the lower altitude in the climb, but the better the glide. Recent improvements in engine output have permitted larger wings to be used, as evidenced by the Ramrod.

To summarize, it can be said that the items considered have a minor effect on the success of the airplane. McCombs has shown in his article that the location of the center of gravity is the determining factor for a successful climbing airplane. If the CG is too far forward, the airplane will loop under power; too far aft, and the airplane will nose over as it picks up speed and will dive in—The machine can be trimmed at many points in between but only at one location for the CG (and this varies) will the plane exhibit its best climb.

For some time, one of the authors (Bogart—Editor) has collected data on successful free flight airplanes, noting their areas, aspect ratios, tail lengths, etc. This



Configurations and proportions, within limits, have a minor affect on the success of the airplane. Other things being equal, the position of the center of gravity is the determining factor for the best climbing plane. For sport, who cares? But contests! This can make a difference.

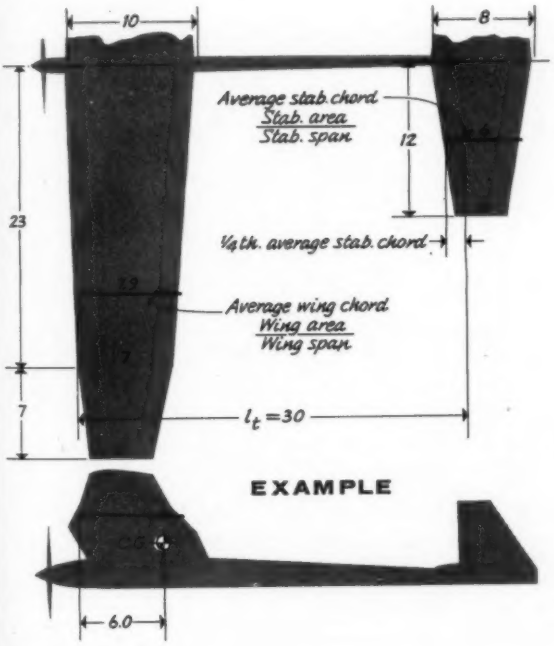
data was collected to aid designing new airplanes. One of the things which has plagued serious model designers is the outstanding lack of technical data. For example, if we had sufficient information, we would know exactly where to place the center of gravity to obtain the desired amount of stability.

For every modern full scale airplane, there are plots made of tail volume (explained below and on Fig. 2) vs. center of gravity location in order to properly design the size and planform of the horizontal tail. Upon reviewing the collection of data, a portion of which is shown in Table I, it was found that, when we plotted model tail volume vs. center of gravity location, the points lined up in orderly fashion thus giving us a clue as to where the CG should be placed. This plot is shown on Figure (1) and has been made from data on Free-Flight Gas, Towline Glider and Rubber ships. By utilizing this plot, a relatively accurate CG location can be selected and built into the model by pylon movement. Therefore, in adjusting the model, only small CG movements will be necessary.

The term tail volume is probably new to most modelers so we'll explain it. It is, in part, a measure of the stability of the airplane and is determined by an equation—which isn't as difficult as it looks.

$$TV_o = \frac{S_t}{S_w} \times \frac{l_{to}}{MAC} \text{ (See Figure II)}$$

S_t is the tail area, S_w the wing (*Continued on page 43*)



For Above Example:

Wing Area $= \left(\frac{10+7}{2}\right) 23 \times 2 + \left(\frac{7+5}{2}\right) 7 \times 2 = 475$ sq. in. $= S_W$

Stab Area $= \left(\frac{8+4}{2}\right) 12 \times 2 = 144$ sq. in. $= S_T$

Average Wing Chord $= \frac{475}{60} = 7.9$ in. $=$ MAC

Average Stab Chord $= \frac{144}{24} = 6.0$ in.

Tail Length $= 30$ in. $\doteq {}^{1}T_o$

Tail Volume $TV_o = \frac{{}^{S}T}{S_W} \times \frac{{}^{1}T_o}{MAC} = \frac{144}{475} \times \frac{30}{7.9} = 1.15 = TV_o$

From Fig. 1, the CG should be located no farther aft than 76% of the average wing chord of .76 × 7.9 = 6.0 in. aft of MAC leading edge.

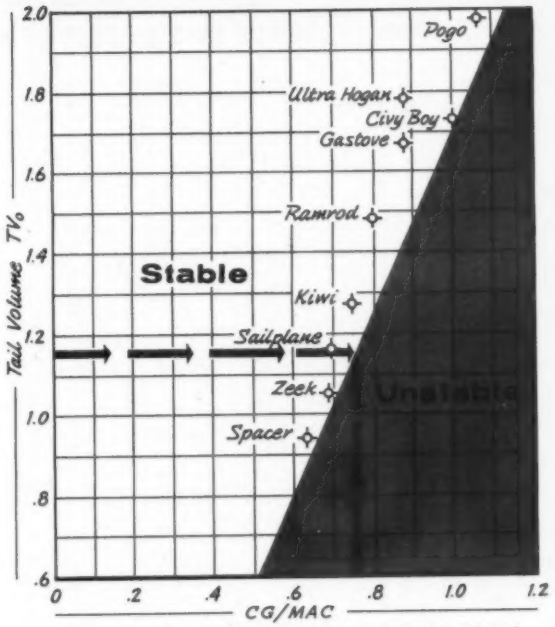


Fig. 1. By using plot, a relatively accurate CG position found.

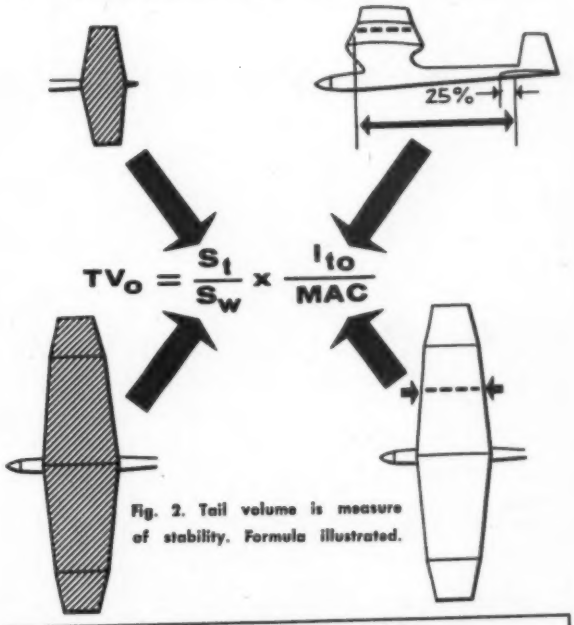


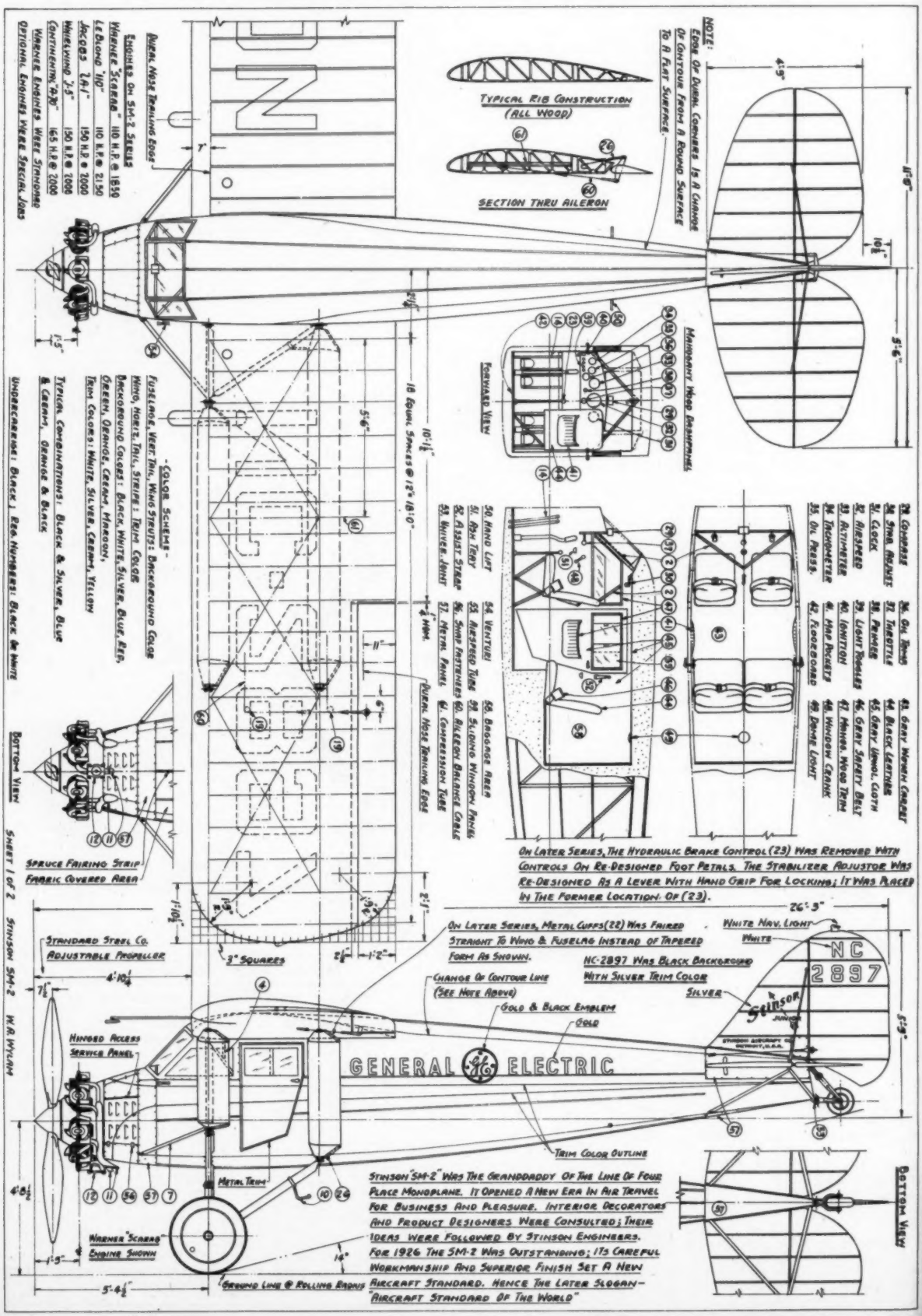
Fig. 2. Tail volume is measure of stability. Formula illustrated.

MODEL AIRPLANE DATA

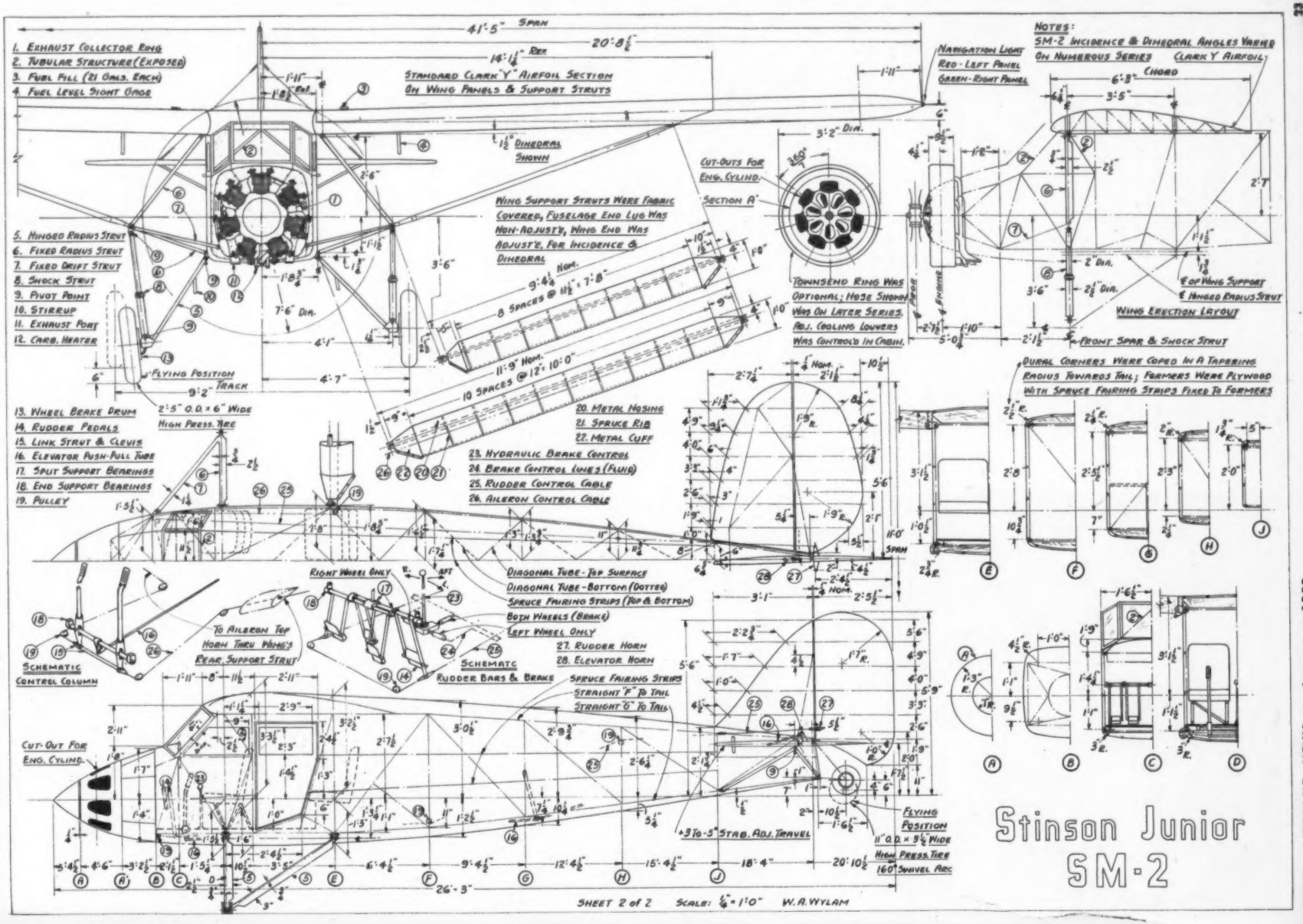
		WING				HORIZONTAL STAB					
MODEL	CLASS	AREA	SPAN	A.R.	M.A.C.	AREA	SPAN	A.R.	TAIL LGTH.	TAIL VOL.	C.G. M.A.C.
ZEEK	A	385	51"	6.6	7.5"	120	25"	5.1	25.2"	1.05	.69
SPACER	B	590	64"	7.0	9.2"	175	26"	3.8	29"	.94	.64
KIWI	1/2 A	186	35"	6.6	5.3"	30	15.3"	4.0	21.3"	1.27	.75
SAILPLANE	C	880	77.5"	6.8	11.4"	282	36"	4.6	41.6"	1.16	.70
RAMROD	C	770	69"	6.9	11.2"	332	40"	4.8	38.6"	1.46	.80
GASTOVE	A	380	52.5"	7.2	7.2"	153	28"	5.1	29.3"	1.67	.98
CIVY BOY	B	575	61.2"	6.6	9.4"	285	33"	4.0	35.4"	1.73	1.00
ULTRA HOGAN	B	504	59"	6.9	8.5"	256	32"	4.0	29.8"	1.78	.88
POGO	1/2 A	170	34.5"	7.0	5.0"	85	18"	3.8	19.8"	1.98	1.06

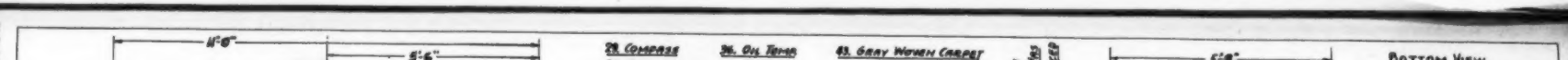
NOTE: M.A.C. = WING AREA / WINGSPAN FOR MODEL DATA

STINSON JUNIOR SM-2 by William Wylam. Beginning a detailed coverage of the Stinson


Engines On SM-2 Series
Wright "Standard" 110 H.P. @ 1850
Le Blond "110" 110 H.P. @ 2150
Jacobs "L-4" 150 H.P. @ 2000
Whirlwind J-5 150 H.P. @ 2000
Continental "R" 165 H.P. @ 2000
Warner Engines Were Standard Optional Engines Were Special Jobs
Rubber Nose Trailing Edge
Typical Rib Construction (All Wood)
Section Thru Aileron
Note: Edge Of Rubber Corners Is A Change Of Contour From A Round Surface To A Flat Surface
Forward View
Mahogany Wood Bearings
Rubber Nose Trailing Edge
Color Schemes
Fuselage, Vert. Tail, Wing Struts: Background Color
Wing, Horiz. Tail, Stripe: Trim Color
Background Colors: Black, White, Silver, Blue, Red, Green, Orange, Cream, Maroon.
Trim Colors: White, Silver, Cream, Yellow
Typical Combinations: Black & Silver, Blue & Cream, Orange & Black
Undercarriage: Black. Reg. Numbers: Black or White
Bottom View
Spruce Fairing Strip
Fabric Covered Area
Sheet 1 of 2
Stinson SM-2
W.R. Wylam
On Later Series, The Hydraulic Brake Control (23) Was Removed With Controls On Re-Designed Foot Petals. The Stabilizer Adjustor Was Re-Designed As A Lever With Hand Grip For Locking; It Was Placed In The Former Location Of (23).
On Later Series, Metal Cuffs (22) Was Faired Straight To Wing & Fuselag Instead Of Tapered Form As Shown.
NC-2897 Was Black Background With Silver Trim Color
Change Of Contour Line (See Note Above)
Gold & Black Emblem
Gold
White Nav. Light
White
Silver
Trim Color Outline
Standard Steel Co. Adjustable Propeller
Hinged Access Service Panel
Metal Trim
Warner "Scarab" Engine Shown
Ground Line @ Rolling Radius
Stinson "SM-2" Was The Granddaddy Of The Line Of Four Place Monoplane. It Opened A New Era In Air Travel For Business And Pleasure. Interior Decorators And Product Designers Were Consulted; Their Ideas Were Followed By Stinson Engineers. For 1926 The SM-2 Was Outstanding; Its Careful Workmanship And Superior Finish Set A New Aircraft Standard. Hence The Later Slogan— "Aircraft Standard Of The World"
Bottom View

family of historically famous aircraft, the Junior makes a wonderful model subject.


41'-5" SPAN
20'-8 1/2"
14'-1 1/4" REF.
1. EXHAUST COLLECTOR RING
2. TUBULAR STRUCTURE (EXPOSED)
3. FUEL FILL (21 GALS. EACH)
4. FUEL LEVEL SIGHT GAGE
STANDARD CLARK "Y" AIRFOIL SECTION ON WING PANELS & SUPPORT STRUTS
1 1/2" DIHEDRAL SHOWN
NAVIGATION LIGHT
RED - LEFT PANEL
GREEN - RIGHT PANEL
NOTES:
SM-2 INCIDENCE & DIHEDRAL ANGLES VARIED ON NUMEROUS SERIES
CLARK Y AIRFOIL
CHORD
CUT-OUTS FOR ENG. CYLIND.
SECTION A
WING SUPPORT STRUTS WERE FABRIC COVERED, FUSELAGE END LUG WAS NON-ADJUST'B, WING END WAS ADJUST'B. FOR INCIDENCE & DIHEDRAL
TOWNSEND RING WAS OPTIONAL; HOSE SHOWN WAS ON LATER SERIES. ADJ. COWLING LOUVERS WAS CONTROL'D IN CABIN.
WING ERECTION LAYOUT
FRONT SPAR & SHOCK STRUT
5. HINGED RADIUS STRUT
6. FIXED RADIUS STRUT
7. FIXED DRIFT STRUT
8. SHOCK STRUT
9. PIVOT POINT
10. STIRRUP
11. EXHAUST PORT
12. CARB. HEATER
FLYING POSITION
TRACK
9'2"
13. WHEEL BRAKE DRUM
14. RUDDER PEDALS
15. LINK STRUT & CLEVIS
16. ELEVATOR PUSH-PULL TUBE
17. SPLIT SUPPORT BEARINGS
18. END SUPPORT BEARINGS
19. PULLEY
2'-5" O.D. x 6" WIDE HIGH PRESS. TIRE
20. METAL NOSING
21. SPRUCE RIB
22. METAL CUFF
23. HYDRAULIC BRAKE CONTROL
24. BRAKE CONTROL LINES (FLUID)
25. RUDDER CONTROL CABLE
26. AILERON CONTROL CABLE
DURAL CORNERS WERE COPED IN A TAPERING RADIUS TOWARDS TAIL; FORMERS WERE PLYWOOD WITH SPRUCE FAIRING STRIPS FIXED TO FORMERS
SCHEMATIC CONTROL COLUMN
TO AILERON TOP HORN THRU WING'S REAR SUPPORT STRUT
RIGHT WHEEL ONLY
SCHEMATIC RUDDER BARS & BRAKE
DIAGONAL TUBE - TOP SURFACE
DIAGONAL TUBE - BOTTOM (DOTTED)
SPRUCE FAIRING STRIPS (TOP & BOTTOM)
BOTH WHEELS (BRAKE)
LEFT WHEEL ONLY
27. RUDDER HORN
28. ELEVATOR HORN
SPRUCE FAIRING STRIPS STRAIGHT "F" TO TAIL
STRAIGHT "G" TO TAIL
CUT-OUT FOR ENG. CYLIND.
+3° TO -5° STAB. ADJ. TRAVEL
FLYING POSITION
11" O.D. x 3 1/2" WIDE HIGH PRESS. TIRE
160° SWIVEL ARC
26'-3"
SHEET 2 of 2
SCALE: 1/4" = 1'0"
W. A. WYLAM
Stinson Junior
SM-2



radio control news

by EDWARD J. LORENZ

Year-end report of the Chowder and Button Pushing Society by the Grand Master.

TECHNICAL TOPICS

► This month we will attempt to clear up some misunderstandings about the new FCC rules and regulations and equipment. The new channels, number One through Six, are: 26.995mc; 27.045mc; 27.095mc; 27.145mc; 27.195mc and 27.255mc. There is no receiver now on the market which will differentiate between these frequencies. Citizen-Ship Radio Corp. points this out in one of their bulletins and we'll back it up.

The receivers used today are super-regenerative and, as such, have a bandpass of about ½ megacycle. The new spread is about ¼ mc, so we fail to see how any claim can be made for selectivity. The only way selectivity can be achieved is by means of a super-hetrodyne type circuit. Word from Babcock Models on this subject has it that their future equipment will enable six pylon jobs to be flown at one time and also give proportional control. They also state that a single-channel receiver for any of the six spot frequencies would be rather expensive.

Via the Peoria R/C Tattler it is learned that Vern Macnabb of Citizen-Ship stated that a pre-amp or converter could be built for their 8-channel gear, if one didn't object to a unit as large as the present receiver itself. A tone receiver to operate on any of the six channels would run quite high, possibly in the neighborhood of $75.00. Many rumors have been going around about a "simple, inexpensive" stage to be added to the front end of present sets which would allow them to select any of the six spots. Again we repeat, don't hold your breath on this. And furthermore, it certainly will not be a "universal" unit, applicable to any set you may happen to have.

Before going on, we repeat our hope of several months ago that certain manufacturers and builders do not—repeat do not—take advantage of the 30 watt limit on 27.255mc. Anyone needing more than a few watts to reliably operate a receiver over the normal ranges should invest in a new receiver. As this was being written, Pioneer was setting a new altitude mark. The distance covered was far in excess of anything previously done with direct-line radio communication, excluding, of course, radio astronomy and the signals bounced off of the moon in past years. In comparison, the transmitting power from satellites would have to be in the hundreds of thousands of watts compared to power used for RC work. We defy anyone to prove that a full five watts of power input is needed with a properly designed transmitter and receiver.

The use of a crystal does not guarantee that the output signal will be the same as that marked on the crystal. This is especially true of overtone crystals and circuitry. The only reliable way of operating a transmitter is by the use of an MOPA, or Master Oscil- (*Continued on page* 35)

Cotton Picken Chicken Plucker, novelty job by Hugh Clark, dropped egg (laid) almost on crowd during a Larks club flying exhibition.

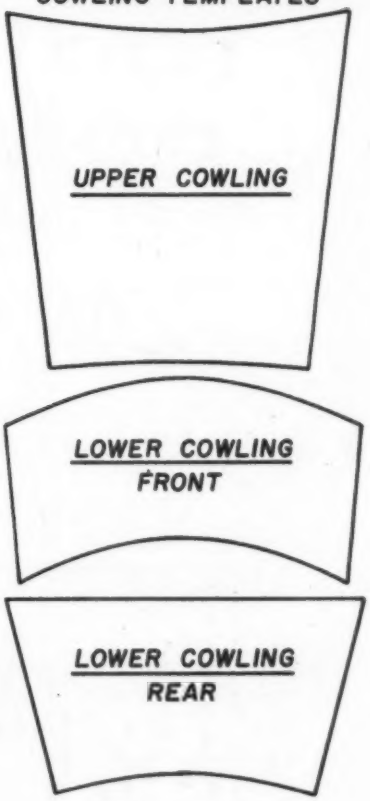
Variety the spice of aeronautical life in Peoria, Ill. Take Jim McClintick's PB-1, bimotor with excellent flight characteristics.

Neat 44-ounce delta by J. A. Hulme, England, was made from German design. Power is an Elfin 1.8cc Diesel. Deltas have good speed.

WEE CHAMPION

by GERALD R. ZEIGENFUSE

Its store-boughten prop spinning on a few cents worth of rubber, Jerry's faithful little Aeronca climbs away realistically for a slowly circling flight. Stretch wind for more turns.



Rubber-powered version of a famous American light plane is a rewarding step up from a ready-to-fly.

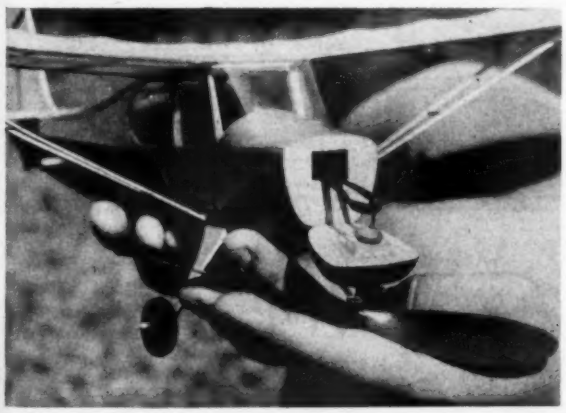
► The Aeronca Champ has long been the favorite of many modelers and also pilots who have flown it. It has the nicest lines of any of the small two-seaters and has ideal proportions for modeling. This is not a 100% exact scale job, but rather a model that accents flying. We have left off many of the fine details and included the usual modifications for good flying and simple building. One look at the model and you will note that it is ruggedly built and uses wood sizes that are easy to handle.

This plane sure is a flyin' fool. No bad tendencies were noted and only a slight rudder adjustment was needed to put the plane in perfect flying trim. If you want a plane that is easy to build and fly and looks like a real airplane too, the Aeronca Champ is your plane. The plans are presented full size so let's get started.

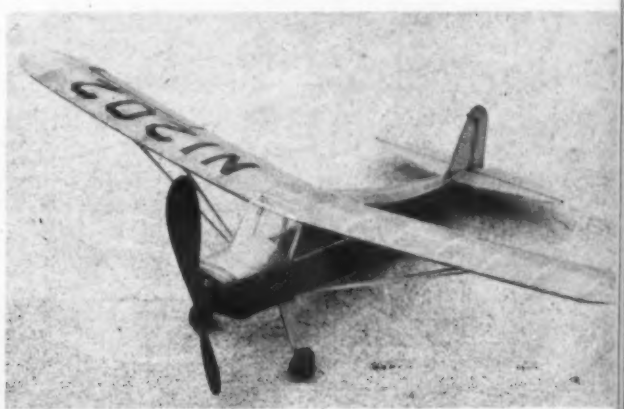
Construction: To begin, carefully remove the plans from the magazine. Tape or cement them together very carefully making sure that both halves are lined up properly. We'll start with the fuselage.

Select several 3/32" sq. strips that are evenly matched in weight and flexibility. (*Continued on page* 43)

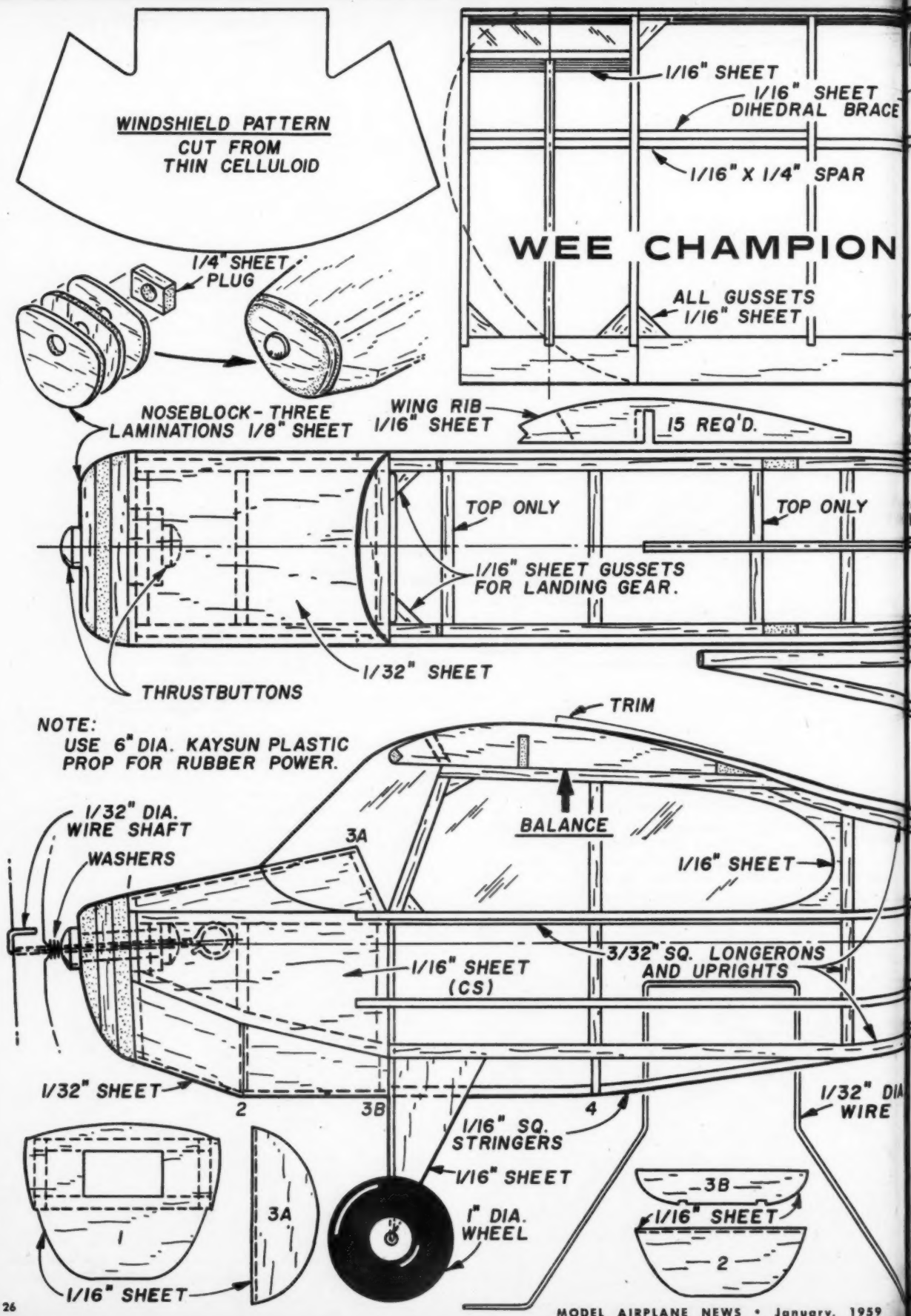
FULL-SIZE PLANS NEXT TWO PAGES

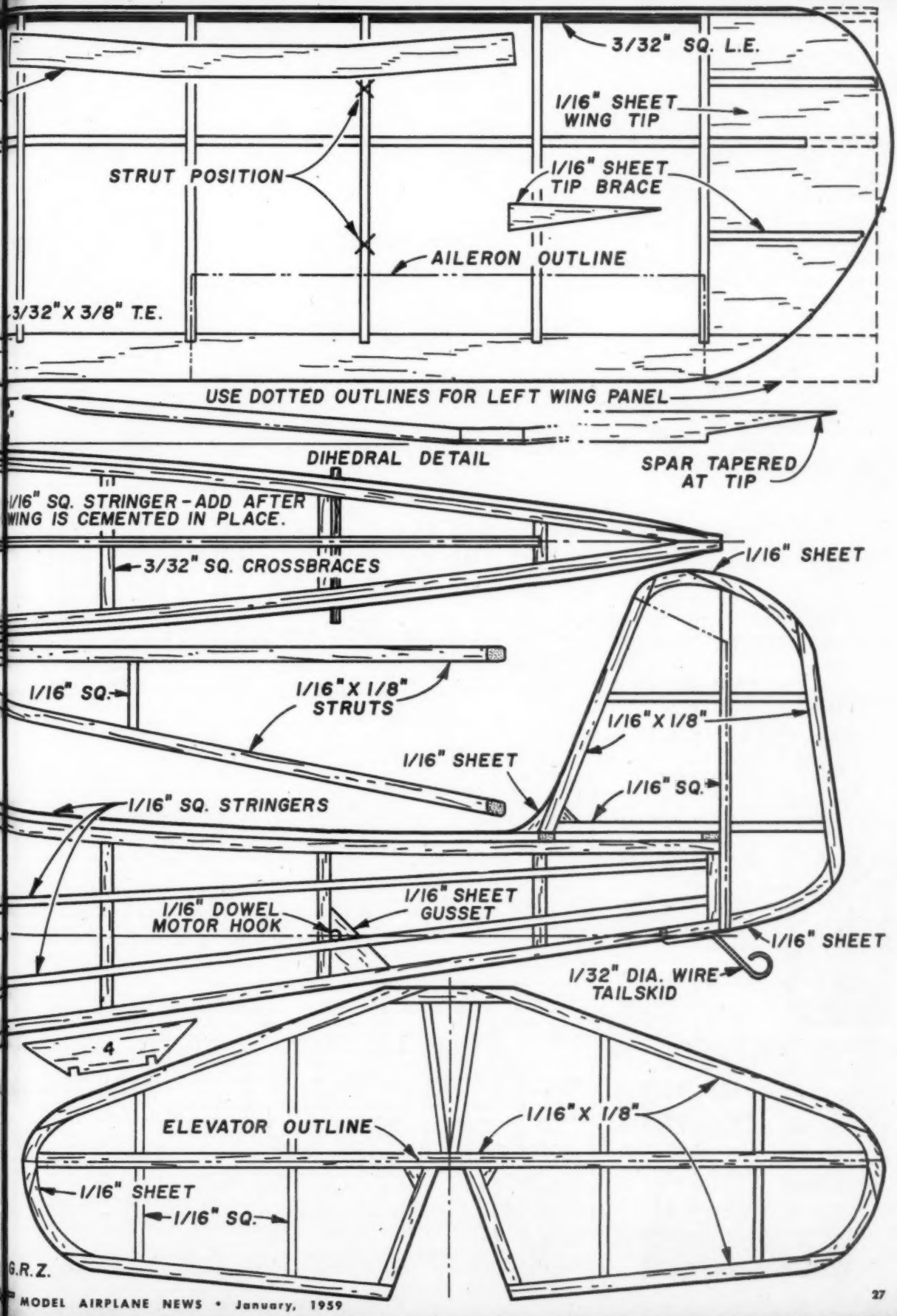


Worth a thousand words, this revealing picture shows how the nose block removes for easy rubber replacement. Hand shows the size.



Despite changes to make it fly like a bird, the Wee Champion has that certain real-plane look that most modelers do demand.


WINDSHIELD PATTERN
CUT FROM
THIN CELLULOID
1/16" SHEET
1/16" SHEET
DIHEDRAL BRACE
1/16" X 1/4" SPAR
WEE CHAMPION
ALL GUSSETS
1/16" SHEET
1/4" SHEET
PLUG
NOSEBLOCK - THREE
LAMINATIONS 1/8" SHEET
WING RIB
1/16" SHEET
15 REQ'D.
TOP ONLY
TOP ONLY
1/16" SHEET GUSSETS
FOR LANDING GEAR.
1/32" SHEET
THRUSTBUTTONS
NOTE:
USE 6" DIA. KAYSUN PLASTIC
PROP FOR RUBBER POWER.
TRIM
BALANCE
1/32" DIA.
WIRE SHAFT
WASHERS
3A
1/16" SHEET
3/32" SQ. LONGERONS
AND UPRIGHTS
1/16" SHEET
(CS)
1/32" SHEET
2
3B
4
1/32" DIA
WIRE
1/16" SQ.
STRINGERS
1/16" SHEET
1" DIA.
WHEEL
3A
1
1/16" SHEET
3B
1/16" SHEET
2


3/32" SQ. L.E.
1/16" SHEET WING TIP
STRUT POSITION
1/16" SHEET TIP BRACE
AILERON OUTLINE
3/32"X 3/8" T.E.
USE DOTTED OUTLINES FOR LEFT WING PANEL
DIHEDRAL DETAIL
SPAR TAPERED AT TIP
1/16" SQ. STRINGER - ADD AFTER WING IS CEMENTED IN PLACE.
3/32" SQ. CROSSBRACES
1/16" SHEET
1/16" SQ.
1/16"X 1/8" STRUTS
1/16"X 1/8"
1/16" SHEET
1/16" SQ.
1/16" SQ. STRINGERS
1/16" DOWEL MOTOR HOOK
1/16" SHEET GUSSET
1/16" SHEET
1/32" DIA. WIRE TAILSKID
4
ELEVATOR OUTLINE
1/16"X 1/8"
1/16" SHEET
1/16" SQ.
G.R.Z.

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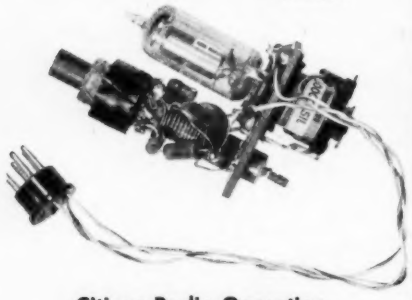

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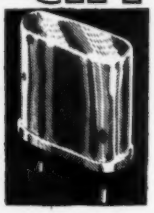
CRYSTALS



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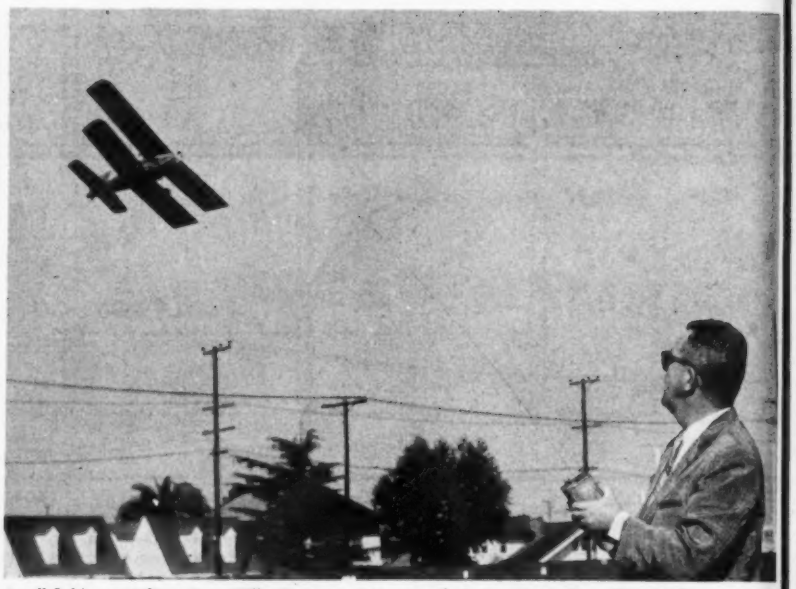

Small-field specialist, Ken Willard, puts one of his little bipes through its paces. The new regulations eventually will put five or more crates in air simultaneously for combat, races

The NEW F.C.C. Regulations

by DORIS AND ED YULKE

Using the new "spots" means a lot more than obtaining a new crystal. Read the "fineprint"—twice over.

► The most important thing about the sweeping Federal Communications Commission Rules is that the changes affecting radio control were made to help solve our specific problems. Two of the changes for radio control alone concern the assignment of five specific frequencies for models and the lowering of the age limit from 18 to 12 years of age for station licenses.

Twenty-odd years ago when Walt and Bill Good considered one successful flight a good day, R/C flying was strictly a matter of using one of the Amateur Bands. When, in March 1953, FCC allowed us to use 27.255 mc (along with many other services), it was considered a milestone. When the new rules became effective on September 11, 1958, you might say that radio control of models came of age. The RCers must accept certain responsibilities now that recognition for the hobby is official.

Suppose we take a close look at how these changes will affect the modelers. First, the lowering of the age limit to twelve will eliminate the need for the FCC to be nice about an unlicensed flier operating a transmitter as long as there's someone else present with a license. They have cars that can pick up our signals and with even the brief transmissions we make, their loop finders can give them a bearing that can lead them straight to the house or field. An FCC official told the writer recently that the practice of allowing a licensed ham to legalize transmission on Amateur frequencies, particularly 50-54 mcs, by just being on the field with an unlicensed modeler who is flying the ship, will no longer be tolerated.

Why? Simply because the rules for Technician's Class of Amateur License were simplified about a year ago. The FCC now requires five words per minute code and the written exam for a license for 50-54 mcs, where it used to be thirteen words per minute under the General Class License. Since the practice which they themselves permitted for so long was not according to the FCC Regulations, this official must remain anonymous, but that practice is just another example of how the FCC has helped us along the line while we were "coming of age." Now it's a serious responsibility to get a station license. Form 505 license applications, revised for the 12 year age minimum, are available from Federal Communications Commission, Washington, D.C. and must be sent back to Washington, (mark envelope License Division) instead of Field Offices in major cities as in the past.

The dream Jim Walker had years ago of racing-type models flying around pylons simultaneously, just as in the National Air Races, is much closer to reality now that we have a total of seven frequencies to choose from. The spot frequencies of 465 mc and 27.255 mc are still available for our use, in addition to 26.995 mc, 27.045 mc, 27.095 mc, 27.145 mc and 27.195 mc. In an area where we fly that is not cluttered up with the traffic lights (at 250 watts), Sheriff's cars (75 watts) or laundry trucks (about 100 watts), we could conceivably fly seven ships in such a pylon race under the AMA Pylon Event Rules! Where 27 mc is cluttered up, we will soon have equipment that will allow at least six of those frequencies (five at "27," plus 465 mc) to fly on.

The FCC Report and Order on Docket #11994 which brought all this about was

scarcely off the mimeographing machines when Vernon Macnabb, pioneer of 465 mc model equipment, announced that his lab had come up with receivers selective enough to fly all of these new frequencies simultaneously on the same field without interfering with each other and that these new receivers could be either single or multi-channel.

England has had six spot frequencies on the 27 band for some time and it was probably this that influenced the FCC a good deal when they were casting about for a method of giving us more space to fly in the radio-frequency spectrum. In England, however, their way of using the six spots utilizes rather heavy equipment of the super-heterodyne type. Here, more progressive activity already is under way.

The McKnight Company, long experienced in manufacturing crystals as well as other equipment, is working feverishly on a crystal-type "front end" or detector stage that can be simply added on to our existing super-regenerative receivers to make them selective enough to be used on our adjacent frequencies. These "front ends" or pre-selectors, will be made available to many of our existing manufacturers and should be available to the modeler by the first of the year. In addition to these simple and inexpensive pre-selectors, it won't be long before we have the home-builders experimenting with sub-miniaturized super heterodyne receivers. Since much of our "standard" equipment like the Lorenz and Hill 2-tubers have been developed by so-called home-builders, we look to them for rapid advancement of the "state of the art."

The five new spots assigned for modeling (class C) are only 50 kc apart, only .05 mc separation from each other. In addition, the FCC has created a new service, the Class D type of use for radio telephony. This simply means hand-held or otherwise portable transceivers that you talk through, as well as listen. The spot frequencies assigned to Class D operation are only 10 kc (.01 mc) away from our frequencies, on each side of us. Many a time when we went after the ship that got away, we wished we had transceivers to talk back and forth between searchers. The units should be available commercially in short order and that brings us to another part of these changes that affect the modeler.

Home-built RF transmitters (carrier wave only, unmodulated with tone) fall into two classes. The first, and for a while, the most popular was the single-tube type, crystal controlled through the grid of the tube. Radio men generally shake their head at these transmitters, since the one tube, usually a 3A4 or 3D6, is being used as both crystal oscillator and output or power tube. This type of transmitter, unless carefully designed, built and tuned, can be far off frequency and, depending on how carefully built, can broadcast a signal that splatters way out on both sides of the numbers on the crystal. In this type of circuit, the crystal runs "hot", or is subject to a current in excess of 15 mils. In short bursts of power (short signals) the crystal will stay where it's supposed to . . . but give the transmitter a fairly long signal and the frequency tends to change as the crystal heats up from the current!

The second and more popular type of transmitter in use lately is the MOPA (master oscillator, power amplifier) type where the crystal is in a separate circuit, with its own oscillator tube, runnin gat about five to seven mils, sometimes less, and this signal generated at low power is fed to a power amplifier-output tube that feeds the signal to the antenna. With the crystal running "cool" at low power and a separate oscillator circuit that is not affected by body capacity, weather conditions, etc., that all act to change (*Continued on page 54*)

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57" span, 43" long, 2 class B engines
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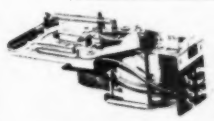

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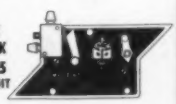

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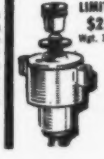

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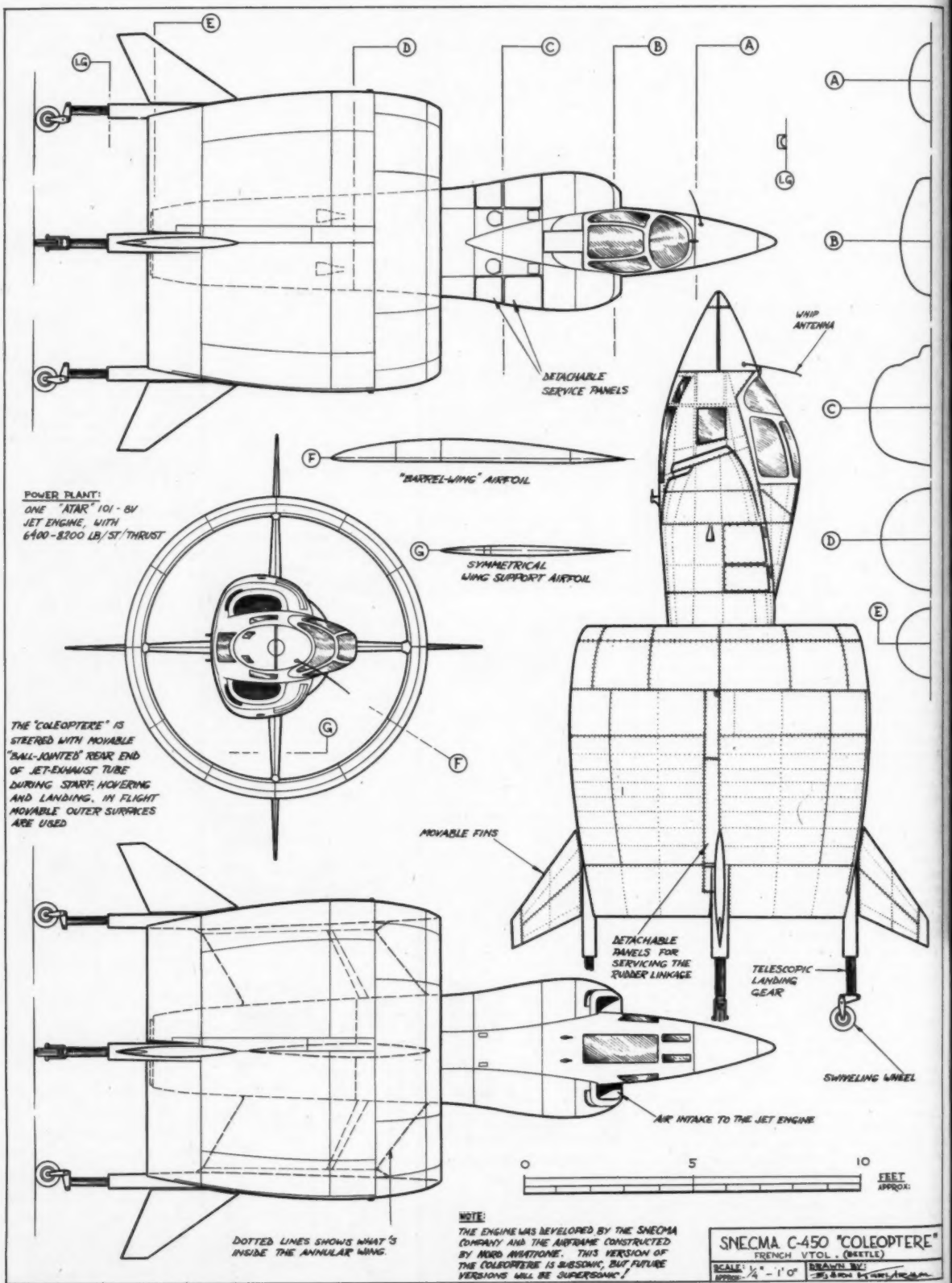
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DOTTED LINES SHOWS WHAT'S INSIDE THE ANNULAR WING.
NOTE:
THE ENGINE WAS DEVELOPED BY THE SNECMA COMPANY AND THE AIRFRAME CONSTRUCTED BY NORD AVIATIONE. THIS VERSION OF THE COLEOPTERE IS SUBSONIC, BUT FUTURE VERSIONS WILL BE SUPERSONIC!
SNECMA C-450 "COLEOPTERE"
FRENCH VTOL. (BEETLE)
SCALE: 1/4" - 1'0"
DRAWN BY:

***ALL IN FAVOR** of a Bright*

Idea for **CHRISTMAS** *say...*

Pee-Wee

by **Thimble-Drome**

"Most exciting new development since the glow plug..." with only 1/50th of a cubic inch displacement! Here's an engine HALF THE SIZE of .049s...yet with so much power and "go" that it flies most 1/2A planes.

Every day the Thimble-Drome PEE WEE is sending new hundreds of modelers to their drawing boards designing SMALLER THAN 1/2A planes, cars and boats that can easily be forerunnners of a brand new "1/4A CLASS" in the fascinating hobby of power modeling!

world's smallest glow engine!

1½ inches high!
1¾ inches from Backplate to Prop screw!
Weighs only 21 Grams!
Develops maximum power at 18,000 rpm—does practical work up to 20,000 rpm!

3.95

PEE WEE IN PRICE, TOO!

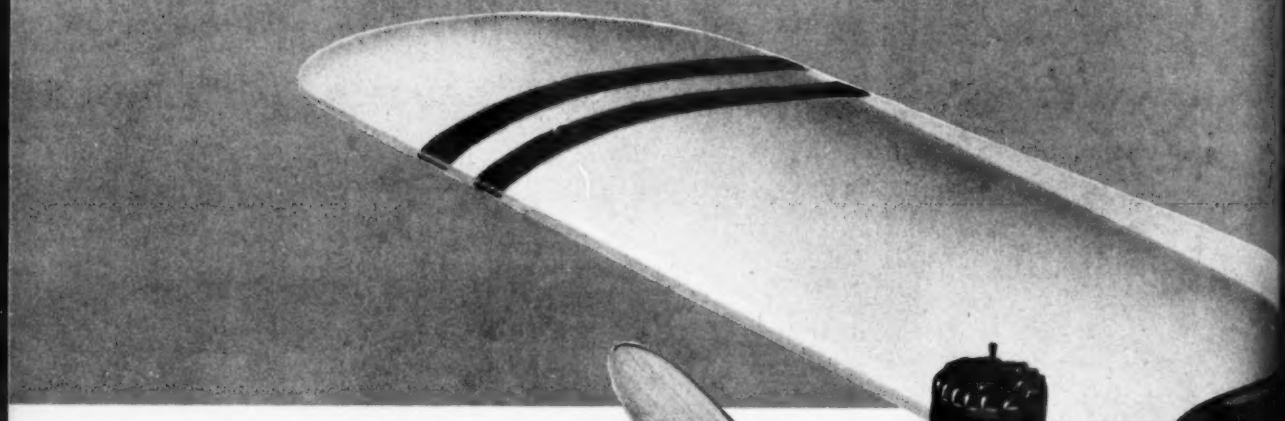
It's engineered by the world's largest maker of model engines!

L. M. COX MANUFACTURING CO., INC. • *730 Poinsettia Street, Santa Ana, California*

TESTORS

FRESHMAN "29"

U-Control Trainer Plane



. . . designed for use with the

McCOY "29"

RED HEAD STUNT ENGINE

$10.00

A WONDERFUL
CHRISTMAS GIFT
to give . . .
or receive!

Best for Beginners

Construction-wise, this outstanding kit has no equal for fool-proof precision assembly — and the only tools you need are pliers and screwdriver! All parts are completely shaped . . . come pre-marked for proper positioning, complete with dowel pin guides or pre-drilled holes for perfect alignment . . . even the hardware is pre-formed to insure correct fit and placement . . . screws are furnished. Because the engine mount and entire lower half of the fuselage are hardwood, sturdy structural frame-strength for withstanding shock and strain is an important feature of the plane. From the flight standpoint, too, Testor's Freshman "29" Trainer is ideal for the beginner. It is easy to adjust . . . easy to fly . . . very stable . . . can be set to do simple stunt patterns. This plane is designed for use with the McCoy "29" Red Head Stunt engine, and has been developed in accordance with Testor's exacting standards for rated achievement levels of construction and performance. Buy it . . . fly it . . . now! (Also available: Testor's "35" U-Control Trainer Plane for use with the McCoy "35" Read Head Stunt engine.)

$5.95

NEW! *TERRIFIC!*

Toshi Matsuda's

ZERO

½A FREE-FLIGHTER THAT
DOES IT WHEN OTHERS FLOP!

$2.95

The hottest thing in 1/2A! It climbs higher, faster... stays up longer. Designed to use ALL the power of the best .049s! For an unsurpassed thrill, hang your engine on a ZERO. See for yourself the super performance that has already won a string of Firsts! At a recent contest the "anyone can get 5 minutes" models were doing 3 to 3½ minutes. Tosh dethermalized his ZERO **three times straight** at over SEVEN MINUTES. Does that tell the story?

WARNING! Watch the engine-run— or you may put your ZERO in orbit!

THE ALL-TIME FAVORITE GOES RADIO CONTROL

MISS TINY $5.95

Exceptional wind penetration and stability!

A good flying R/C Model doesn't have to be an ugly box! Miss Tiny is world-famous for her beauty and flying qualities. Uses hot .049 to .099 engines, depending on weight of R/C gear. Wing Span 46". Finished cowl and die-cut parts.

FREE FLIGHT DELTA

for .049 Just $2.50

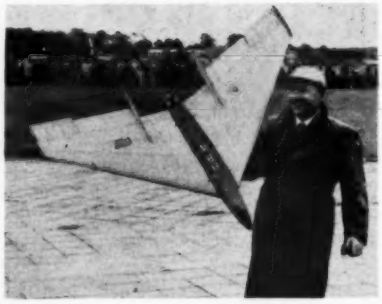
It doesn't take a hot shot to build and fly this Delta, although a lot of hot shots are flying them in order to be putting something different in the air. If you too are curious about a Delta, here's dependable performance and true Delta characteristics in a job that has been thoroughly proven before being announced.

Ask your Dealer, or send M.O. and we'll ship prepaid. (Mr. Dealer: If your jobber won't supply you, send M.O. for prepaid shipment, regular discounts.)

MODELCRAFT

8945 SOUTH WESTERN AVENUE
LOS ANGELES 47, CALIFORNIA

.....radio control



Fast climbing delta, flown by Eugen Setz, from Switzerland. Powered by Japanese Enya, 3.5 cc.

Winner second straight year, Karl-Heinz Stegmaier, pneumatic controls. Ruppert twin diesel.

European Radio Control CHAMPIONSHIPS

were held on September 20-21 at Griesheim in Germany.

J. P. Gobeaux readies low-winger as Dad operates pump. Stegmaier 3247 pts., Gobeaux 3245.

Brother of Jean-Pierre Gobeaux, Belgium, with same model. Equipped with Ruppert, an Orbit 8.

Single-channel winner, Eric Berglund, Sweden, manufacturer of Telepilot radio—which he used.

Beautiful low wing, Helmut Bernhardt, Germany. Ruppert Twin Diesel and Stegmaier multi-control.

news.....

(*Continued from page 24*)

lator Power Amplifier circuit when high power output is desired. Single-tube transmitters, employing a crystal and one stage RF section, should be kept to a minimum power output. With the new frequency tolerances of down to .005% this becomes even more important.

A word about the new FCC registration form, #505. The new form is more detailed and you are testifying under oath when the form is signed by you. Instruction sheets are now available for filling out form 505. Part 19, Citizens Radio Service data is part of the Commission's Rules and you must have this before you sign your application form. This can be obtained for 15¢ from the Superintendent of Documents, Government Printing Office, Washington 25, D.C. We purposely are not describing Part 19 so as to make it necessary that you send for it and have it in your possession. Don't think the new rules are too harsh or full of too much red tape, since this is far from the truth when you compare the setup in the USA with that of other countries. Play ball, do the job right, and we're sure you'll benefit from it. This is the dawn of a new era in RC and, judging by some of the designs on the boards, the future looks mighty promising. Incidentally, existing licenses are valid until they expire. However, be sure you get the new form 505 before reapplying.

• • •

Fig. 1 shows the simple circuit used by Don Nielson of Poughkeepsie, N.Y. for keeping a close check on his Simpl/Simul pulser. A visual signal is far better than trying to listen for clicks to determine if things are working properly with a pulse system. Merely place the bulb and pencells across the normally open relay contacts. Don taped the bulb housing and battery to a plug and just plugged the assembly into a jack for test observations.

• • •

Fig. 2 shows the curves obtained on VO-500 and VO-800 cells when checking them for the duration flight use last year. Section A was taken using VO-500 cells, and having them connected in a circuit to simulate receiver operation. A Telechron clock mechanism drove a commutator to produce two pulses per minute, each pulse having a six-second duration. Current drain was maintained by using the circuit shown, "X" being the switched circuit from the commutator. The resistors gave an 11ma no-signal drain and a 48ma signal-on drain. This was based on the CG RT-1-3V receiver. Temperature of the two cells in series, during test, was 70 F. Voltage drop at each reference point for signal on vs signal off current was .025 volts. Needless to say, the VO-500's held up exceedingly well and the choice of power could be reduced to VO-250's for reliable operation up to 16-18 hours.

• • •

Section B shows curves obtained on VO-800 cells. This test was primarily for checking the stability of the receiver, but battery info was obtained at the same time. The receiver was sent three pulses every eight hours, each pulse three seconds duration. Temperature during tests was 70F. The voltage drop from no-signal to signal condition was but .01 volt until the end of testing at 72 hours.

(*Continued on page 36*)

FLY QUICKLY & EASILY WITH 2 and 3 Channel RADIO CONTROL FROM CharlieCG

Here's a team that can't be beat for precision flying!
The RT-2 receiver shown at left uses only one 30 volt hearing-aid battery. (If built from a parts kit requires one additional pen cell). Weighs 3½ ounces less batteries.
This high sensitive receiver is the answer to smooth R/C flying. At right is the T-3 transmitter, crystal controlled by FCC specifications with tuned antenna for maximum range. This 3 channel transmitter has push button control and audio tuning accessible from exterior of cabinet. The T-3 is recommended for use with the RT-2 receiver as well as the RT-3.
The RT-3 receiver shown at left uses same 30 volt battery combination as RT-2, weighs 5 ounces (less batteries), measures 2" high, 3" long, 1¾" wide in blue anodized case. Both receivers available in part kits form.
For finest flying fun you've ever had, ask your dealer about these factory tested and tuned receivers from Charlie C. G., or write for completely illustrated free catalog.

WRITE FOR FREE ILLUSTRATED CATALOG
DEPT. MA1

CG Electronics CORPORATION
15000 Central Avenue, SE Albuquerque, New Mexico

HERE IT IS!
FROM ESSCO RC PRODUCTS —

THE LITTLE ADV WITH THE BIGGEST VALUES IN RC
THE RC CENTER U.S.A.
ESSCO AUTHORIZED DISTRIBUTOR FOR ALL STD RC ITEMS

ARE YOU CONFUSED about the new FCC regulations on RC operation? Don't be, see our November ads for a simple explanation of the main points affecting RCers. If you are not certain that your present 27.255 crystal falls into the required higher tolerance, send it to us with $2.25 and we will "horse trade" you for any of the 6 RC channels. Our regular price for a .005% crystal is $3.95, you save $1.70—Only ESSCO offers this money saving service, don't delay, do it Now . . .
ARE YOU UNCERTAIN that RC equipment purchased now will be operational on the new channels? It is widely known in the industry that multiple operation of several models at one site is not possible with RC receivers presently in use. Multiple operation will be possible in time when more selective receivers become available. But why wait & miss the fun of flying just as before with presently available equipment? ESSCO will have ready early in 1959 a converter unit which will easily attach to our present THT sets and give you superhet selectivity at low cost. In the meantime buy with confidence our standard THTs and discover for yourself "real reliability" in flying.
ESSCO SANTA CLAUS SPECIAL—Save $5 and get the best. Order a 1959 deluxe model THT receiver at the regular $21.95 price, for $2.00 additional you can obtain one of the new RC channel (.005%) crystals (reg. $3.95) a savings of $1.95. Specify desired channel with order. The 1959 model THT receiver features "stayput" piston type controls. Easy initial adjustment guarantees long periods of operation without resetting. Low A & B batt. drain, 63 ma fil., .25 ma idle with 5 ma plate current rise with signal. Standard model supplied with aluminum crash protection case, MICRO GEM or paladium X bar contact relay. Absolutely the industry's best buy. $21.95
THE NEW FCC rules now in effect require all RC transmitting equipment to stayput on frequency. Some of the XMTRs now in use cannot fulfill these requirements because of "loose" design. Those XMTRs keying vibrator power supply filtering to obtain tone modulation were never legal and especially so under the new tighter rules. So be sure that your XMTR with "flip of a switch tone" circuit uses a legal method of modulation.
It is our considered opinion here at Essco that the only type of XMTR circuit that can economically be produced to meet with FCC regulations are those using the MOPA type circuit, with tone work the MOPA circuit is a must.
THE NEW ESSCO HIPOWER MOPA (FCC compliance) XMTR is your best buy in RC XMTRs today. Modern 2 stage 3 tube circuitry used to give either 3 or 5 watt power as preferred.
DELUXE hand held unit with antenna, only 23.95
DELUXE hand unit with 2 volt cell & power pack .. 39.95
DELUXE GROUND CASE job with cell, power supply, all purpose charger & multi-purpose meter. Ideal for dual proportional 27mc $64.95, 50 mc 74.95

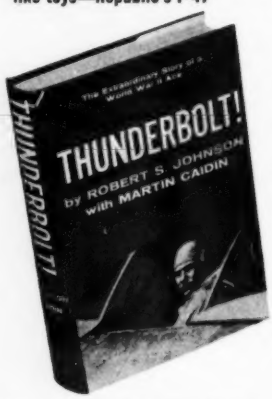
BONNER S.N., $5.95; Bonner Vari Comp. $6.95
Dual Vari Comp, 10.95; Bonner R.E. model 9.75
Bonner Nylon Control Horn, .25; Tail Wheel Bkt. .50
BONNER RC hookup wire, .00; Essco wire ..... .50
BONNER SERVO, 14.95; Cobb Slim Line 8.95
CITIZEN-SHIP Servo Actuators, all $14.95, Kit 11.95
COBB HOBBY Stick Control Box for all comp. 12.95
COBB HOBBY Selector 4, 8.95; E5 & E10 ..... 5.95
BABCOCK Mark II, 7.95; Elect. Comp 6.95
#887 Sequence Relay—#891 Motor Cont. 8.95
DEBOLT MULTI SERVOS—The orig. for all RC work
2PN Single Channel rudder only 11.95
2P2N Single Channel Auxiliary 11.95
3P Single Channel Engine control 10.95
3P3N Single Channel Engine control 11.95
3P3NX Single Chan. Eng. cont, w. nylon gears 14.95
2P2NX Single Chan. Auxiliary, nylon gears ... 14.95
3PNX Single Chan. engine cont. nylon gears 14.95
MCR 2 channel, rudder/ailerons. nylon gears 18.95
MCE 2 channel, elevator/engine, nylon gears.. 18.95
MPN 1 channel, multi control for boats 24.95
DEBOLT Fuel tanks, 2 oz 1.19; 4 oz 1.69; 6 oz. 1.95
DEBOLT Dural Landing Gears, RC-4-5-6, .49; 1.00; 1.25
VECO Clunk Tanks, 4 oz 1.20; 6 oz 1.50
BRAMCO Motor Throttle Control, for all engines 4.95
ANNCO, two speed motor control 3.95
ROTO-VALVE, Engine Controls, all mod. 2.00 to 4.95
ROTO-BRAKE, 2¾, 3 & 3¾" wheel brakes 9.95
NEW EVEREADY NI-CAD Button Cells 1.95
AA SIZE NI-CAD CELLS 2.50
THE NEW OB Prprtnl. Actuator, 10.95; deluxe 14.95
ROBOT JR, G/G dual actuator, 9.95; SYNCRO.. 19.95
FLYBALL Actuator assembly, 2.45; Comp mtr 5.95
HILLCREST Plastic Battery Cases, all types .45 & .95
ECTRON Battery cases, 6 pen .75; 4 med .85; multi 1.65
ACME Battery Cases, all popular types in stock.
YU'SHU MODEL Silk, your best buy, all colors 1.00
IMP Recharrgeable cells/batteries, NT-8 type 4.75
2V/1¼A, 1.25; 2V/2A, 1.35; 2V/5A, 3.75; 4V/1¼A 1.45
R&S Converter, 30 & 45 volt B from pencells ...15.95
RRM Non-pitting paladium contacts, 500 ohm rly 3.75
GEM STD, 5000 ohm, 4.25; 7500 ohm 5.45
MICRO GEM, 5000 ohm, 4.95; 7500 ohm 5.95
GEM DPDT, 5000 ohm, 6.25; 7500 ohm 6.75
SIGMA 4F, factory fresh 6.00; SIGMA 26F 8.50
DEANS Reed units, 8 ch. 22.50 5 chan, 19.95
FULLY GUARANTEED 1st GRADE (no 2nds or re-brands) RC TUBES CK1054, $2.50; 1AG4, $2.25; Amperex 6007, $1.95; CK521, $2.25; 3A4-3A5-3V4-3S4, $1.40; 3D6 ..... 1.80
FEDERAL 1215 diode, .75; Dual IRC diode 2N191 1.25
ESSCO ALL PURPOSE Bat. Charger complete unit 7.95
ESSCO Whip antenna, 10½ feet for new channels 3.95

ESSCO - NEW YORK
58 WALKER STREET
NEW YORK 13, N. Y.
Telephone WA 5-8187

BUY ESSCO RC PRODUCTS at your local dealer
PROMPT FRIENDLY SERVICE
Complete satisfaction in RC

If not available at your local shop order direct from listed dealers or New York office for FAST SERVICE incl. postage & obtain FREE BONUS.

- He saw his first plane at 8—and decided then he had to be a pilot
- Four years later he got off the ground in a Ford Tri-Motor, and at 14 he soloed in a Wiley Post Trainer
- At 18 he was in C. P. T., flying a Taylorcraft and dreaming of Hurricanes and Spitfires
- On December 7, 1941, he was a cadet at Kelly Field, where he took his Stearman PT-18 biplane up for aerobatics one day and came down again with his seat belt still unfastened!
- They trained him in the North American BT-9 Yale, BC-1 and AT-6 at Kelly and Randolph
- Then the 56th Fighter Group gave him a plane that made all the others look like toys—Republic's P-47



This is the autobiography of ROBERT S. JOHNSON, who racked up 28 air kills in less than a year to become America's leading ace in the ETO. Twenty-four of those kills were the deadly Me-109's and FW-9's that, until then, had ruled the air over Europe. And the stories of how he made them are some of the most vivid and accurate descriptions of air battles ever written. You won't want to miss

THUNDER-BOLT!

by Robert S. Johnson with Martin Caidin

(winner of the James Strebig Memorial Award for aviation writers)

Illustrated • $3.95

And have you read QUENTIN REYNOLDS'

They Fought for the Sky

It's the story of the air heroes and incredible planes of World War I, illustrated with 32 pages of rare photographs. $3.95

EXAMINE ONE OR BOTH BOOKS NOW—AT NO RISK

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232 Madison Ave., New York 16, N.Y.

Rush me my copy of .... THUNDERBOLT! .... THEY FOUGHT FOR THE SKY. I enclose .... $3.95 for one or .... $7.90 for both in check or money order. If I am not completely delighted with either book I may return it within 2 weeks for a full refund.

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New York City residents please add sales tax.

Both these tests showed that current drain vs. time was very easily obtained from the given capacity of the individual cells, a feature not obtainable with dry cells. All in all, these cells are really terrific and are being used by more RC'ers each day. We accidentally shorted out two VO-250's which were connected in series. The cells literally got hot enough to fry an egg. One got hot enough to melt out the plastic insulation and was thus destroyed. The other one held up and after cooling down was as good as ever.

CLUB NEWS

How much did that last multi job cost you to build? Furthermore, how much do you think it costs to fly such a job for about a year? Enough to build another model? The Pioneer Radio Controller's "The Modulator" reports that Andy Anderson racked up the 204th flight on his six-foot Cub, back in August. Over a 13-month period, close records of money spent on fuel, props etc., was kept and this five-channel CG equipped plane used up about 21 cents on each flight. Average flight time was about 12 minutes for a total air time of 40 hours, 48 minutes; 38 pints of fuel were used, in addition to 14 props, 20 pencells, four 30v receiver batteries and three sets of transmitter batteries—plus one firewall. Total operating expense for a little over one year of flying comes to about $43.00. First such statistics we've run into!

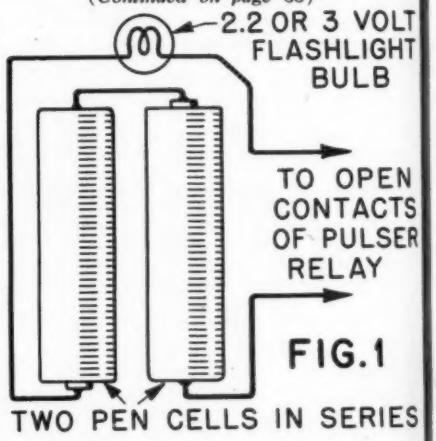
• • •

The Peoria RC Tattler states that a test was made using VO-500 cells and the CG three-volt receiver. Results were practically the same as we obtained on a test—47 hours for the VO-500's without recharging. This club also received word from CG that it appears to be impractical to build a converter to provide selectivity for the new frequencies. This confirms what we have mentioned in past columns. Plenty of flying activity in the Peoria area, with all types of planes being flown. Anyone interested in joining an active group in this area contact Jim McClintick, Box 1234, Peoria, Ill.

• • •

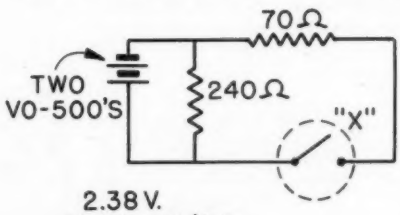
The English builders are represented this month by Mr. J. A. Hulme, Gorselands, Kings Road, Wilmslow, Cheshire, England. Photo shows the Delta wing as designed by a German builder. Weight is 44 ounces, the receiver being a twin hard tuber, similar to the Essco THT, and the engine is the Elfin 1.8cc diesel. Another pic which won't reproduce does show the typical super-het type set used in England for boat work. This set has a crystal controlled oscillator, two 1T4's and a 1R5. The relay is mounted separately and the

(*Continued on page 38*)



C.G. RT-1-3V RECEIVER CHECK

FIGURE 2
(SECTION A)
(TWO VO-500
CELLS IN SERIES)



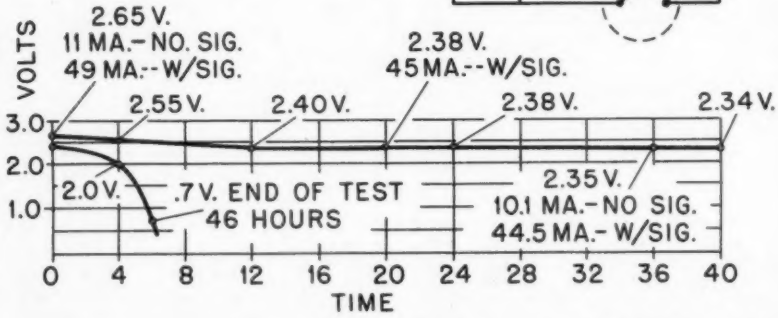
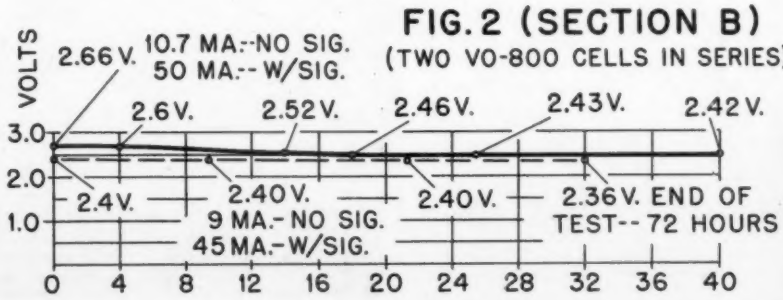


FIG. 2 (SECTION B)
(TWO VO-800 CELLS IN SERIES)



only TOP FLITE brings you these terrific planes of

DURALUME

Two Outstanding COMPLETELY ASSEMBLED READY-TO-FLY PLANES

- Both are rubber powered or readily adapt to .020 gas engines for control line.
- Both planes have a wingspan of 18 inches, length 14 inches . . . and they REALLY FLY!
- Both are guaranteed to R.O.G. and V.T.O.—just wind the prop and let 'er go!
- Both planes are completely assembled . . . nothing to build . . . ready-to-fly in seconds!

RYAN TRAINER
Model No. F-2 **$1.98**

Each plane in colorful box with see-thru plastic window — choice **$1.98**

SILVER ARROW
Model No. F-1 **$1.98**

Both planes have real formed fuselage (not stick type) and are trimmed in contrasting colors. Each model complete with free wheeling plastic prop, spinner, canopies, pilots, wheels, landing gear and extra rubber motor.

Just what is DURALUME? It is a revolutionary new concept in model plane building material. Genuine ALUMINUM FOIL is permanently bonded to balsa wood, making the strongest, most flexible material in ratio to weight ever created for model plane construction!

DURALUME is based on the scientific skin-stress principle. The aluminum "skin" over the balsa takes the stress. It supplies the "give" and elasticity that results in wonderful break-resistant qualities that unsupported balsa simply does not have. Ground loops, crashes and bumps that would dash an ordinary balsa plane into splinters almost beyond repair, have little or no effect on a DURALUME plane because of its amazing bounce and bendability! Result: a DURALUME plane is many, many times more durable . . . practically beyond compare!

DURALUME PLANES LOOK JUST LIKE THE REAL THING! The bright, shiny, sparkling, mirror-like ALUMINUM FOIL reflective surface makes the model plane look just like the real planes because it is the very same metal, giving true realism. Even the rivets, ailerons, etc., are embossed on the aluminum, and in addition, contrasting trim printed on the surface in bright colors provides lots of eye appeal!

"DURALUME" JIGTIME KITS that are fun to build and fly!

- RUBBER POWERED or can be flown with Pee-Wee and .020 Engines*
- EACH PLANE IS GUARANTEED TO FLY!
- TRIMMED IN CONTRASTING COLOR!

NAVION — **$1.29**
KIT DJ-2
Wingspan 16"
Length 13"

LUSCOMBE
KIT DJ-3
Wingspan 18"
Length 13" — **$1.29**

ARROWJET — **$1.29**
KIT DJ-1
Wingspan 15"
Length 14"

All parts are completely finished, ready to assemble, and will punch out of die cut sheet without breaking apart. No tools or experience needed to build, and assembly is easy because each part fits only into its exact place, just like an easy jigsaw puzzle. Plane can be repaired in a jiffy with cellophane tape.
Kits are complete and include landing gear, wheels, prop, rubber motor and all necessary parts.

*Each kit contains a detailed plan to convert plane for use with Pee-Wee and .020 engines.

SILVER DART RUBBER POWERED KIT

A PLANE THAT CAN BE COMPLETELY PUT TOGETHER WITH JUST CELLOPHANE TAPE IN LESS THAN 30 MINUTES!

Each kit contains a detailed plan to convert plane for use with Pee-Wee and .020 engines. No tools, no cement needed. Saves damage to clothes, rugs and furniture. The "Silver Dart" is guaranteed to fly and is ideal for youngest beginners.
Kit includes formed fuselage and wing, plastic prop, spinner, wheels, canopy etc., formed landing gear and rubber motor. All parts are completely cut out and finished. Plane is trimmed in beautiful colors. Complete with fully illustrated, easy-to-follow, step-by-step assembly plans.

KIT KD-1
$1.29

SILVER STREAK CONTROL LINE GAS KIT

- A real thriller for Pee-Wee and .020 engines!
- Everything included for complete assembly!

An ideal plane for beginners because it can be built easily and quickly, usually within an hour, from easy to follow plans for "no mistake" assembly. No painting or doping necessary.
Complete with FORMED fuselage, formed landing gear and push rod, control horn and bell crank, control handle and lines, plastic prop, engine mount, wheels, canopy, etc.

KIT DG-1
$1.95
WINGSPAN 18"
LENGTH 13"

AT YOUR HOBBY DEALER NOW!
Hobbyist, if no hobby dealer is available, your needs supplied direct. Just add 25c for postage and handling.

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the Winners! '54

RINGMASTER CONTEST • 1st PRIZ

RINGMASTER FAMILY IN ACTION!

Dad David M. Painter, 312 Janney Ave., Muncie, Ind. with sons Bob and Mike, all flying Ringmasters. 13-year-old Bob flies the "Baby Ringmaster" with .049 engine. 15-year-old Mike flies "Ringmaster Jr." with .15 engine. Dad David flies his "Ringmaster" with .35 engine. "All three are stable fliers and good stunters," says Dad.

Carl C. Bosi, Jr., Assistant Treasurer, Girard Trust Corn Exchange Bank, Philadelphia, removes from bank vault, sealed envelope containing actual number of Ringmasters sold, for verification of contest entries with Ed Manulkin of Sterling Models.

Entries were received from all 48 states and 5 foreign countries. Age of contestants went as high as 54 years old. All 52 Sterling Kits were used by contestants.

"Good kits . . . second to none!" says Pierre Hartshorne, 3330-A Villa St., Los Alamos, N. M. who made the closest guess of the actual number of Ringmaster Kits manufactured! His guess 238,333 . . . Actual Number — 237,51

Mr. Hartshorne buys his Sterling Model Kits fr Decol Specialty Shop, Community Center, L Alamos, N. M. He's splitting his winnings ha and-half with the Mrs.

2d Prize:
T. E. Doubleday
609 Queen St.
Sputhington, Conn.

3d Prize:
R. F. Brown
202 Massachusetts A
Massapequa, N. Y.

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power comes from a 1½ and a 45v battery. Needless to say, the size could be drastically reduced by using some of the subminiature IF transformers available in this country and by using transistors. These particular receivers, designed by Mr. McQue, have excellent selectivity. A signal 10kc away from the receiver frequency has no effect on the receiver, even when it is in close proximity to the transmitter. The transmitters generally used are twin tube circuits, crystal controlled and are vibrator supplied.

• • •

The DC/RC club is trying to promote a club airplane project, something unique to the club and which would be beneficial in promoting RC to newcomers. This should be a small, rugged, easy-to-construct model using a lightweight, low-cost radio system. Control movement by escapements and a reliable and economical .09 engine. Club members are requested to submit designs. This sounds like an excellent idea for other clubs. Some of the highlights of the 1959 season are the DCRC Radio Control Symposium to be held April 11th and 12th and the 3rd Annual DCRC Radio Control Contest on the 3rd, 4th and 5th of July. Do you have a problem of "unauthorized" fliers disrupting field and flying activities? The DCRC club now makes it necessary that all fliers have a club decal on their ships. Might work.

• • •

In the British Aeromodeller magazine we saw the plans for their most successful multi-channel job. Designed by Chris Olsen, this is a 72-inch model, powered by a Fox 29. Radio equipment is a home-built system patterned after the Orbit-8. Total weight of the RC installation, including home built servos is about 2½ pounds. This symmetrical wing model has engine, rudder, elevator and aileron control. Using straight lines in the design, this is a rather clean ship and employs conventional construction with a built-up fuselage. Only unusual thing about it is the 18% thick airfoil. From the looks of it, it appears that this ship would offer quite a bit of competition in American contests.

• • •

One of our old RC flying buddies from Columbus, O., is Andy Bauer, now of 4245 Greenbrier Road, Long Beach, Calif. Andy has been doing stability and control study work on C-124's and C-133's. His RC work suffered for the past few years but with a modified six-foot Rudderbug and the Simpl-Simul system he is back in the swing of things. The Simpl-Simul system has a tough row to hoe out in the land of Orbit-8's but Andy claims it is just the thing for plenty of fun on an under nourished pocketbook. He has several improvements on the S/S system which we hope to describe in a coming issue.

On September 14th, the Flying Bisons held a class A R/C contest which included quite a few out of towners, instead of the planned club members only. Vern Krehbiel took first in rudder only by placing but one point ahead of Chuck Hansen. Multi was also won by Vern, followed by Max Bray and Herb Tomoser, just two points apart, and 4th place nailed down by Don Hoffman. A special award was given to Mr. Hansen and Mr. Hoffman for high points gathered by fliers who made this their first contest. This is an aspect that few clubs even care to discuss. Some of the west coast clubs go all out to encourage the newcomer and especially the new contestant to RC work. This club plans to

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have a gab-fest get-together sometime in January. Might be a good spot to learn about winter building and prepare for '59 flying. Fran Ptaszkiewicz, 113 Eckhart Street, Buffalo, N.Y., is the Corresponding Secretary.

• • •

Mr. J. A. Schmieding reports that the most active model club in the middle west, taking in Appleton, Neenah and Menasha, Wisconsin, and known as the Valley Aero Modelers, really put across the effectiveness of RC planes at a fall contest. Hundreds of coupons were dropped among the spectators, from radio controlled models. Gliders were given to those turning in the coupons and those gliders having colored rudders were good for U-Control kits. Quite a novel idea. Club info in care of Mr. Schmieding, 2118 N. Division St., Appleton, Wis.

• • •

The West Coast RC Championship, held September 13th and 14th saw Advanced Multi being taken by Bob Dunham (isn't anyone trying to beat him), Jerry Nelson, H. Bonner, Dale Root and Bill Deans in that order. Chuck Boyer streaked to a big win in the Pylon event, flying a scale P-51 Mustang which moves along about twice the speed of a good Astro-Hog. The Aerial Robots of Modesto, California also report that the novice classes at these contests, and others, have definitely helped getting more fliers into contest work. Anyone doing anything about this in other parts of the country, or will the '59 Nats look like the Larks rooster?

• • •

No matter what we say about one club group, something better pops up elsewhere. Ev Schoenberg of the WRCC (Wichita, Kan.) reports that during September, Dean Zongker flew his Dooling 61, "Speed Merchant" to an unofficial record of 90, yes 90 mph. The down wind pass getting into the fractional Mach numbers with a record 117.6 mph. By the time you read this he may have a new AMA/FAI record in the book. Usable as a pylon racer, it is said to be plenty hot with just a .19 in it, let alone a Dooling 61. Four channels of an Orbit-8 are being used. All this speed at an altitude of but 30 feet. Ok Californians, can you top this?

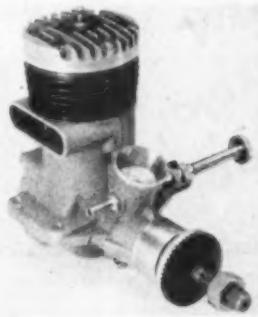
• • •

The RC/NC group of North Carolina is still piling up the RC flights, both in contests and sport flying. Jim Thrift somehow let his Tri-Pacer get away and it parked atop a telephone pole in the middle of town. Bob Baker uses the Babcock two-channel 465mc equipment in his Champion. This area uses a fair amount of 465mc equipment, as we recall. No interference or waiting-in-line problems. This club gives prizes such as the Travel Trophy (most members from a group going to a contest), Crash Trophy (no explanation needed), Sportsmanship Trophy, and Top Flier Trophy.

• • •

Last item this month comes from the East Bay Radio Controllers of Oakland, Calif. In addition to being a group of excellent RC fliers, this club had a "fast model building" contest. Twelve teams of two men each used a Carl Goldberg prefab and the usual pins and fast drying cement. Object was to build the model and have it fly for at least five seconds or in a straight line for 30 feet. The team of John Wall and Chris Leggo won in 24 minutes. Endurance flights and dog-fights followed. Not a bad idea for livening up a club meeting. (*Continued on page* 40)

1ST PLACE WINNER '58 NATS
YOUR '58 CHRISTMAS PRESENT



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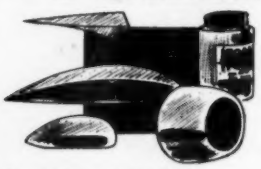

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GULL MODEL AIRPLANE CO., 10 EAST OVERLEA AVE., DEPT. M BALTIMORE 6, MD.

As it must come to all men, Dale Root allowed his Low Ender to pass in front instead of in back of a plane flown by Bob Heise. Bob's Custom Ascender had its prop take the left side of the stab and elevator completely off of Dale's plane. After it peeled off into a steep spiral dive, Dale backed off on the throttle but to no avail. A fuselage and wing shattering hit completed the sequence. Just prior to this, during the pylon contest, Bob commented he really has no trouble flying with three or four other fliers since "the chances for a collision are about a million to one."

NEW ITEMS

Just to prove that RC is on the upgrade, the deBolt Engineering Company, 3833 Harlem Road, Buffalo, N.Y., is devoting their full effort to RC kits. With three times the floor space in their new plant they hope to turn out the needed RC planes and accessories for the coming season. Price increases have been made with the Rebel and Trainer now $9.95, the Champion and Super Cub $13.95, Cruiser at $17.95 and the Custom Live Wire at $21.95. The formed dural gears, positive flow tanks, hardwood engine mounts and pure gum rubber bands remaining about the same in price. Patents have been granted on their line of multi servos and they are now again readily available. Dmeco may have a low wing job, in the Astro class, which may be knitted in time for next season's flying.

• • •

Herb Honecker of RC/DC reports that Esse Radio Company, 40 W. South St., Indianapolis, Ind., has surplus nickle-Cadmium cells. A ¾" x 2" x 6", 10 amp/hr cell is $1.95, a five-cell 6v battery is $7.95, and a ten-cell 12v battery is $14.95. These would be ideal for transmitter supplies using vibrators or DC-DC converters. Also make excellent engine starting batteries.

• • •

Al Diem, 11111 Lund Place, Kensington, Md., is marketing a new transistorized DC converter known as the Miniverter. Measuring 1¾" square and ¾" thick, the weight is but 0.6 ounces with the plastic case or 0.42 ounces without. Output is 15ma at 45 volts or over 30ma from the 30-volt tap. Plenty of capacity for reed or proportional receivers. The 30-volt tap will supply up to 50ma with a voltage drop of but about three volts, much better than any battery you could use. Price is $15.95, postpaid.

• • •

We recently tried the new Webra .15 Komet. For $13.95 you can get the .15 or .19 German deisel. Easy starting, the .15 will produce over ¾ HP with a 9-6 prop. A two-speed needle valve assembly can be obtained for $2.95 extra. For those who want to try something new, a vacuum pump is also available for this engine for $9.95. This unit will enable the ambitious RC builder to duplicate or design a system similar to the German Stegmaier control system of vacuum operated servos. An exhaust throttle and silencer is also available for $2.49.

• • •

Samples of the new escapements produced by the Cobb Hobby Mfg. Co., Box 31, Powder Springs, Ga. Weighing about one ounce, the two- and three-position escapements measure ¾" x 1-5/16" x 2-3/16", exclusive of shaft extensions. Current drain at three volts was measured at 450ma. Sells for $5.95.

• • •

The new Babcock Aeronca plastic RC model is announced. Similar to the Tri-Pacer described in past columns, this plane

(*Continued on page* 42)

PATENT PENDING

New ANNCO MOTOR CONTROL
ONLY $3.95

The new ANNCO two-speed valve gives you Hi Speed, Lo Speed and Fuel Shut-Off from any Single Needle Valve glow engine. From .049 to .60 Actuated by escapement or servo for RC or third line for U-Control.

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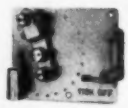

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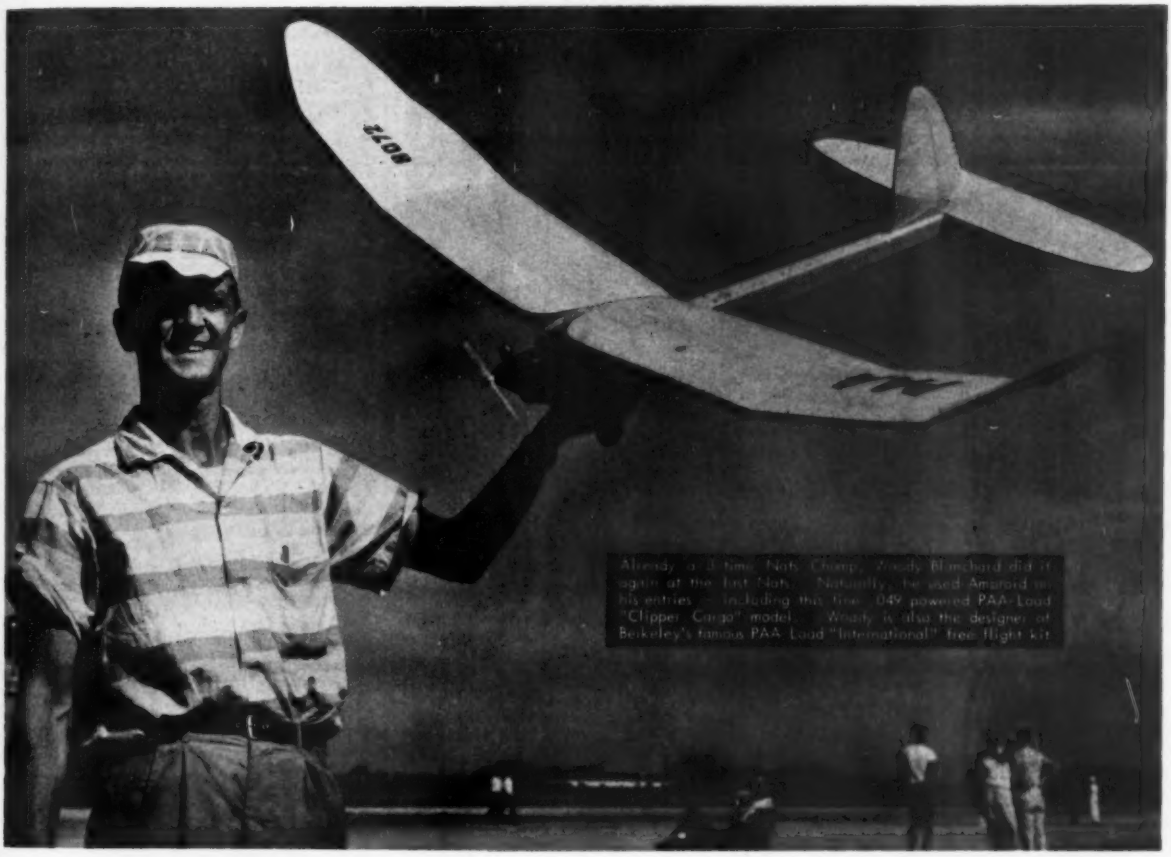
NATS CHAMP USES AMBROID!!


Already a 3 time Nats Champ, Woody Blanchard did it again at the last Nats. Naturally, he used Ambroid on his entries — including this fine .049 powered PAA Load "Clipper Cargo" model. Woody is also the designer of Berkeley's famous PAA Load "International" free flight kit

"In my opinion" — says Woody Blanchard — "Ambroid is tops"! Worthwhile cementing tips from the 1958 Nats Champ are: "To use several thin coats of 'Regular' Ambroid for all critical joints — and one coat of 'Extra-Fast' Ambroid for lightly stressed joints and speedy flying field repairs". In company with most leading contest fliers, model designers and kit manufacturers, Woody knows that you simply can't afford to use cheap cement. Its got to be Ambroid.

Next time you visit your local model shop to buy materials or hardware, don't just say "throw in a tube of cement", as an afterthought. That expensive kit, engine, covering and finishing materials (plus many hours of painstaking construction work) can all too quickly finish up as a sorry pile of scrap, due to structural failure resulting from the use of inferior cement. Discriminating modelers insist on Ambroid because its waterproof, fuelproof, transparent and even works on hardwood and metal just as well as on balsa. Of course, it costs a few pennies more, but the "best" usually does. In cement, you certainly get what you pay for — as foolhardy users of bargain brands "B" and "C" will sadly affirm. So take our advice and stick to Brand "A" (that's us!) or your model planes are likely to fall apart! And don't say that we did'ent warn you .....

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"REGULAR" AMBROID — FOR MAXIMUM STRENGTH CONSTRUCTION

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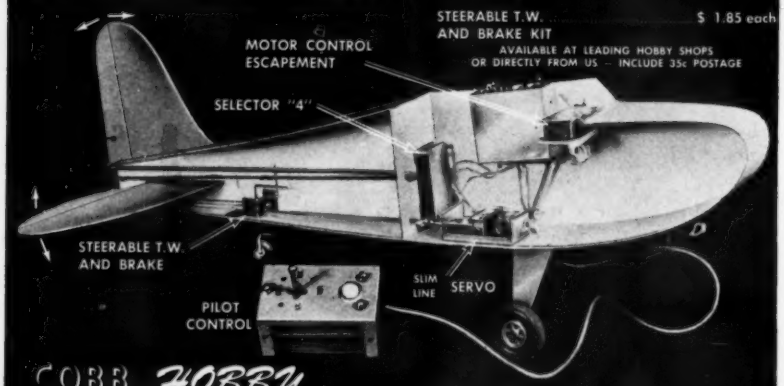

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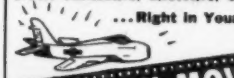

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has the same 27-inch span, is suited for .049 engines and sells for $9.95. Flight tests on our Tri-Pacer were very good, using a Cox .049, a Babcock escapement and the B & S receiver. Only extra comment we have on the kit is to reinforce the seams in the bottom of the fuselage cabin with pieces of scrap plastic. Control hinges might also be reinforced by cementing narrow strips of plastic over the formed hinge. Outside of this there were no problems in balancing, gliding or flying this model.

• • •

With the new frequencies in effect, crystals for all spots can be obtained from Berkeley Models, Inc., West Hempstead, N.Y. for $3.95. Other RC parts suppliers can supply certain of the six-spot frequencies. Babcock Models will supply all of their equipment with 26.995mc crystals. This will help to minimize interference from traffic light controllers. All present receivers that we know of will be retunable to this frequency. All transistors can be retuned after inserting a crystal of 26.995mc.

Yearly trophy awarded to winner Pacific Radio Control Society's contest, by Sierra Electronic Corp., W. Feldscher, pres., left; Bob Foncell, of Trophy Committee, right. Dunham won it.

THE VERY FINEST FOR RADIO CONTROLLED FLYING

THE "TRAINER" .09 TO .15
SPAN: 48"

THE MOST POPULAR R/C MODEL!

"LIVE WIRE"

The name signifies PROVEN BEST for all R/C flying! Flown by beginners and experts alike, noted for performance, simple, rugged construction and their long list of contest laurels. You'll have the BEST with a LIVE WIRE!

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MULTI OR SINGLE CONTROL
SPAN: 65" .19 TO .29 ENG.
PAY LOAD: 2 1/2 LBS. **$17.95**

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SPAN: 56" .15 TO .19 ENG. **$13.95**

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Watch That CG!

(*Continued from page 21*)

area (projected), l_{t_o} is the length from the leading edge of the wing to the quarter chord location on the tail, and MAC is the mean aerodynamic chord, and for model work can be approximated by dividing the wing area by its span. Figure (2) shows a diagram of the tail length and MAC.

In order to measure the tail length, you must find where, on the wing, the average chord is located. In Figure (1) it will be noted that the center of gravity is given as a fraction of the MAC. In order to find this number, measure the distance between the CG and the leading edge of the MAC in a direction parallel to the center line of the body. Divide this length by the MAC and you have the CG location as a fraction of the average chord.

Now, in using Figure (1), you must determine the CG and the tail volume of your airplane. If your values fall far to the left of the line shown, your ship probably is carrying some downthrust and is quite stable. It probably climbs in a tight spiral. If you wish to increase your climb, move the CG rearward, retrim the wing or tail for the glide, and observe the results. You'll probably see an improvement. If your CG and TV_o points are to the right of the band, chances are your ship is unstable or nearly so. This is seen when a ship stalls in the glide with ever increasing violence. If the CG is further aft, the airplane will dive into the ground under power. It is much safer to keep the CG on the safe or stable side of the line. Then tiny adjustments of the CG will produce your best climb.

Thus, the placement of the center of gravity is not really so much a mystery any more. If you haven't been satisfied with the climb of your ship, check its TV_o and CG location on Figure (1). You then can tell which way to move the CG with respect to the MAC.

Figure (1) should be considered a guide in properly locating the CG. Flight tests can only more accurately dictate the CG position.

Wee Champion

(*Continued from page 25*)

These will be used for the longerons. Mark them in some manner so you don't use them for anything else. Put wax paper over the plan to protect it and also keep the cement from sticking to it. Pin the 3/32" sq. longerons down to the plans. Don't stick the pins through the strips but place a pin on each side of the strip and angle them over the strip to hold it down. There are two sharp bends in the lower longeron in the front of these places to form the proper outline. Once the longerons are pinned down, start cementing the 3/32" sq. uprights in place. Cut the uprights to fit as accurately as you possibly can and do not try to force them into place. Don't forget to add the little triangular gussets and the larger gusset in the rear of the fuselage for the motor hook. After constructing one of the sides, proceed to build a second side directly on top of it. Just slide the 3/32" sq. longerons through the pins that are already in place and then add the uprights and gussets as you did for the first side.

After allowing several hours for the cement to dry, (preferably overnight) remove the pins and carefully lift the completed fuselage sides from the wax paper. You will have to separate the sides with a razor blade as they are probably stuck together. Take care when doing this so as not to ruin all of your work.

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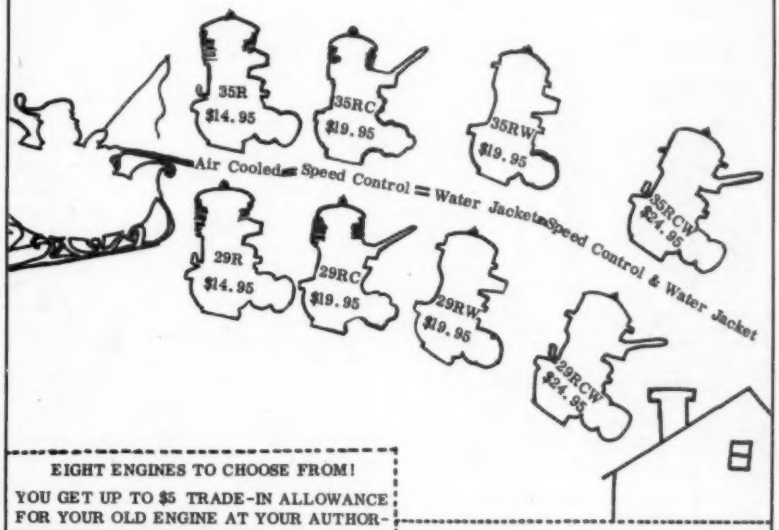

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put them together to form a box-like structure. Cut out 12—3/32" sq. crossbraces 1¼" long. These crossbraces are the ones separating the fuselage sides from the nose of the fuselage to the rear of the cabin. Check the fuselage sides and make sure that they are properly lined up and straight. Let the cement set for about one half hour and then cement the rest of the crossbraces that you have cut out in place. Note that on the top of the fuselage there are two extra crossbraces. After allowing the cement to set again, pull the fuselage sides together at the rear and cement. A spring type clothespin is handy for holding the sides together while the cement dries. Now add the remaining crossbraces and we have finished the basic fuselage structure.

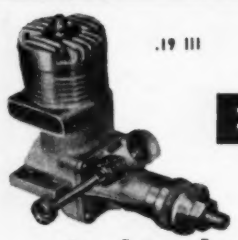
To complete the fuselage, cut out all the bulkheads from 1/16" sheet and cement them in place. Note that bulkhead #3A is slanted. Cut a temporary gusset from scrap balsa to hold bulkhead #3A at the correct slant until the cement dries. Next, cement the 1/16" sheet cowling sides (CS) to each side of the fuselage at the nose. Cut these pieces to the correct shape before cementing them in place and also notch them for the 1/16" sq. side stringers. Now cut out the cowl templates that accompany this article and use them to cut out the 1/32" sheet cowling pieces. It is a good idea to fit the paper templates (trace them if you don't want to cut the magazine) in place on the fuselage and make necessary adjustments to be sure you have a perfect fit before cutting them out of 1/32" sheet. Cement the cowling pieces in place one at a time. To make for easier bending, use a light, straight grained piece of 1/32" sheet and moisten the outside slightly before cementing in place. These curves are not difficult at all and take only a few pins to hold the cowling pieces in place until the cement dries. Shape the 1/16" sheet cowling sides by sanding until they blend in with the rest of the cowling.

The fuselage is now finished by cementing the two 1/16" sq. side stringers in place one each side and the two 1/16" sq. stringers on the bottom. Do not be alarmed if the bottom stringers bulge out of shape as they will assume the proper shape once the covering is applied and shrunk. The top stringer is not added until the wing is cemented in place. The landing gear is bent from 1/32" dia. wire over the plan and cemented in the fuselage. Cut out triangular gussets from 1/16" sheet to hold it in place firmly. The fuselage is now sanded lightly to remove all cement bumps.

It is a good idea to make the nose block at this time. Place the nose of the fuselage down on a piece of ¼" sheet and trace around it. Cut this part out and make two more just like it. Note that the direction of the grain on one of the pieces runs opposite that of the other two (See plan). Cement them together (using contact cement—such as Pliobond—cuts time here) and also cement a ¼" sheet plug to them. Before cutting out the plug, drill a ¼" dia. hole in a piece of ¼" sheet and then cut the plug out with the hole in the center of it. It is almost next to impossible to drill the hole after the plug is cut out without splitting it. After all the pieces have been cemented together and the cement is dry, drill the ¼" dia. hole the rest of the way through the noseblock. Now, plug the nose block in place and roughly carve it to shape and finish it by sanding it and blend it in with the lines of the fuselage. Cement the thrust buttons in and it is complete.

We build the wing next. Cut out 15 wing ribs from 1/16" sheet. Stack them

.19 III



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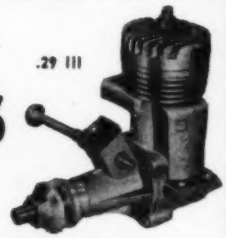

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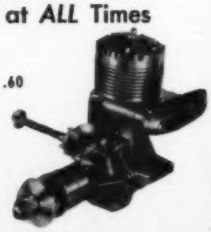

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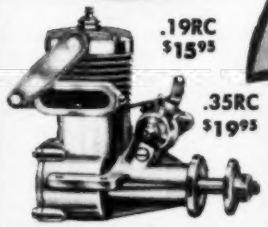

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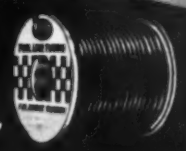

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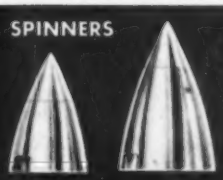

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together for sanding and notching. When cutting the notch, check it with a piece of 1/16" x ¼" to make sure it fits snugly, not tight or sloppy loose. Next cut out the 1/16" sheet wing tips. Now for the spar, take a 1/16" x ¼" strip and taper it as shown on the plan. Place wax paper over the plan and then pin the spar down. Before pinning the 3/32" x ⅜" trailing edge down, notch it for the wing ribs. Cement the ribs in place and then the 3/32" sq. leading edge which is set on edge. Note that at the tip, a portion of the leading edge is removed to allow the wing tip to fit into place. Cement the wing tip in place now, noting that it slants upward against the spar. Place a small block under it to hold it up. Cement the two small braces in place also. When the cement has dried, remove the wing half from the plan and build the other half using the dotted lines to guide you. When the cement on this wing has also dried, remove it too from the plan. The wing halves are now blocked up 1", brought together, and the small center section is built between them. Don't forget the dihedral braces and the small gussets. After this is completed. lift it from the board and lightly sand it. Round the leading edge and remove any cement bumps.

The tail surfaces are constructed by first cutting out the small curved parts from 1/16" sheet. Then pin the 1/16" x ¼" outline strips down and complete the outline by cementing the curved pieces in place. Then fill in the 1/16" sq. strips. Let the tail surfaces dry thoroughly to prevent warps.

We now come to covering and the final assembly. We'll start with the tail surfaces because they're easiest to cover. Brush a coat of clear dope around the outline and let dry. Sand lightly to remove the fuzz. Now, cut from model plane tissue a piece large enough to cover the surface to be covered. Use yellow tissue as that is the color of the real plane. Apply another coat of dope all around the outline and before it dries lay the tissue on the surface to attach it and then smooth it out to remove any wrinkles. Trim off the excess tissue with a razor blade and then cover the other side in the same manner. Spray with water to shrink the tissue and when it has dried brush on one thin coat of clear dope.

The wing is covered in the same manner as the tail surfaces. Be sure the grain of the tissue runs the length of the wing to prevent excessive sag between the ribs. Cover the wing with four separate pieces of tissue, one for the top and bottom of each panel. Do not cover the center section at this time. Water shrink the tissue and then clear dope the wing. Two thin coats are sufficient.

The fuselage is now covered. Remember to predope before covering. Cover each side with one piece of tissue. The bottom requires at least two pieces of tissue. One from the rear to the stringers and the other one over the stringers. If you have difficulty getting around the stringers, then use three separate strips of tissue. Do not cover the top of the fuselage. The cowling is covered with several pieces of tissue. The cowling templates can be used here to cut the tissue to fit properly. Cover the noseblock too. You will have to use several small strips to get around all the curves. Water shrink the tissue on the fuselage and then brush on two thin coats of clear dope. The trim may be added now if desired. The aileron and other control surface outlines are thin strips of black tissue

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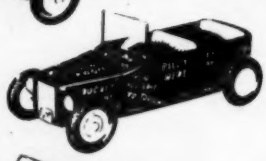

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doped on. The numerals and the color trim on the fuselage are orange tissue. Cut the tissue letters out and hold them in place and dope over them. The dope will penetrate through the tissue and attach the letters.

Now we assemble the plane. Cement the wing to the fuselage taking care that it is on straight and true. The top stringer is now cemented in place on the fuselage and sanded to fair in with the center wing rib. When the cement has dried, cover the top of the fuselage and the center of the wing with one piece of tissue. Water shrink and then dope two coats as you did on the rest of the fuselage. Then cement the tail surfaces in place taking care that they are also straight and true. Cut out the windshield, using the pattern on the plan, from thin celluloid and cement it in place. Also cement celluloid over the side windows.

The landing gear is now completed by cementing the triangular pieces of 1/16" sheet to the landing gear and the fuselage. This is also covered with tissue for color. Use 1" dia. wheels and retain them with a drop of cement on the axle. The wing struts can be built and cemented in place if you so desired. They contribute nothing to the performance of the plane and may be left off. If you decide to put them on, you can color them with a thin mixture of colored dope and thinner. Use just enough color to tint them.

Before we fly the plane we must complete the prop assembly. Use 1/32" dia. wire for the prop shaft and bend a loop in it. This is the front motor hook and we now insert the shaft through the nose block from the rear. Slip a few small washers over the shaft and then the prop. Bend a U in the front to fit over the prop and cement the shaft to the prop.

The motor is made up of four strands (two loops) of ¼" brown rubber 9" long. Before installing it in the plane, wash it to remove the powder and then, when it is dry, lubricate it. We use a 50-50 mixture of glycerine and tincture of green soap. It can be bought at any drug store. Drill a 1/16" dia. hole through the 1/16" sheet gussets at the rear of the fuselage. Now drop the rubber through the fuselage from the front and secure by pushing a 1/16" dowel through the loops at the rear. Hook the motor to the prop shaft and we are all set to fly the plane.

Before flying, we better check the flying surfaces for warps. If there are any warps present, they may be removed by twisting them in the opposite direction of the warp and holding over a steaming tea kettle for a few seconds.

Hand glide the model a few times to check its flying trim. Don't push hard, just give it a gentle shove with the nose down slightly and aimed for a spot about 25 ft. in front of you. If the balance is perfect and the model tends to dive, warp the trailing edge of the stabilizer up. Do the opposite if it stalls. Incorporate a small amount of right rudder to produce a gentle right hand turn. Once you have accomplished the above mentioned procedures the rest is easy. Just wind it up and let it go. Try about 50 turns on the first flight and gradually work up to 200. The plane should climb out in a wide right hand circle and when the power is exhausted glide quickly down in a large right hand circle. If the plane has a looping tendency under power, try to tighten up the circle under power by bending the rudder more to the right. If this doesn't help, then add a little down-thrust. Put a paper match stick in between the nose block and the fuselage on the top to tilt the nose block down. If

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you have trouble with the nose block falling out, just build up the plug with strips of cellophane tape until it fits snugly and will not fall out when holding the plane nose down.

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Dawn to Dusk?

(*Continued from page* 14)

5-1/2 hours (Willard) and the glider record at 8.34:21 (Cone, Chase). Since control-line endurance with inflight refueling (through a neoprene tube by a pumping system) is akin to flag pole sitting, and free flight projects might be a threat to aircraft, endurance narrows to RC.

Now if one were shooting for a record, an *almost* ordinary model, engine and fuel, using familiar control-system items, should be good enough—on paper, of course. But when you say dawn-to-dusk, or even 12 hours, the job is more complicated. And when you come to the end of the long, hard trail, you'll find it tough to attempt that take-off with fuel enough for sunrise to sunset—when all you need is six hours to be famous! On a 15-hour flight, you'll have nine hours to go after the record is smashed—and you can spin in or fly away at any time.

The trial airplanes evolved in experiments throughout 1958 have successfully taken off with heavy loads of fuel, and with radio and batteries with a proved capability beyond the longest daylight time of the year. These machines are Diesel .09-powered jobs—there are other combinations possible, ranging from .049's through .19's, Diesel or glow, that look very good indeed. The .09 ships span about seven feet and, loaded from six to 6-1/2 pounds gross, have gotten off in 480 feet (13-16 hours fuel) in calm, 175 feet in 15-20 mph wind, 110 feet (8 hours fuel) in a 10 mph wind. With fuel for normal 10-minute sport flights they slide off the runway in 50 to 100 feet with a mild breeze. Despite their size and low power, on concrete they can match take offs with Smog Hogs and Astro Hogs—unless the multi job pulls hard up elevator.

Empty, these ships weigh in at about 60 ounces—with radio, batteries, and gear, including a 48-ounce capacity fibre-glass tank. Expected were extreme difficulty with taking off, an inability to fly in the wind, and egg-shell crates that would disintegrate in a wrap-up. Actually, these lightly loaded, low-powered craft proved robust, took off well, and made over 100 flights between two ships, with many flights in winds of 12-15 miles an hour. A few ten-minute tests were made in 20 mph winds with gusts to 25 mph. The planes stayed up wind, maneuvered well, and spot-landed almost within reaching distance. This certainly shook the concept that power and high wing loadings are required to fly in the wind.

International rules (FAI) greatly limit airplane size and loadings. Any duration job is a challenge, and a dawn-to-dusk design requires black magic as well as ingenuity. Free flighters will love the problem, for the rules basically are free flight rules! FAI says you cannot exceed 16.38 ounces per square foot of flying surface area (wing and tail combined, figured as projected area). Gross flying weight cannot exceed 11.025 pounds. Maximum engine

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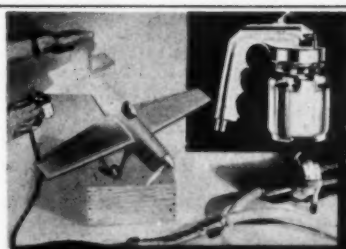

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size is .61—you'd probably need all the weight for fuel, and you cannot exceed 16.1 square feet total area.

You are the designer. Suppose you pick a glow .19 that burns only 10 ounces of special "economy" glow fuel. Your desired duration is 15 hours. This means 150 ounces of fuel alone! To stay within 16.38 maximum loading, you'll have to build big and light—so light, in fact, that the fuel will outweigh the aircraft, radio, batteries, and all! Willard was forced to add a small sesqui wing to stay within rules for an anticipated flight of about five hours. As a biplane, Big Breathless would not take off, and Ken figures maximum theoretical duration of the six-foot ship is 7-1/2 hours.

Fortunately, for these MAN experiments, a group of experts could be organized to investigate different phases of the overall problem. Most of the plane designing was done by Norm Rosenstock, with ye editor getting in some telling blows. E. J. Lorenz ran months of fabulous tests with all kinds of simulating apparatus, including a week end run in a heat oven to prove out transistors. Norm came through with some exhaustive test set-ups, too. Pete Chinn did a memorable job on engines, tanks, and fuels—as time will prove. Frank Hoover at CG, and Irv Megeff at Essco were a big help. Irv lost many a weekend and holiday checking for us proposed systems and radios, on live set-ups.

The results are promising, to say the least. The 1958 test models revealed a 12-15 hour potentiality and, when a few small problems (as they say) are solved, a final plane will fly that would require lights for operation at both ends of the day. Can we presume that man will hold up his end?

Why an .09? Why a Diesel? First, there is the problem of high glow fuel consumption. An American engine manufacturer has proved since that a .19 can be cut down to nine ounces; but .15's are no better. You can do somewhere around 15 hours on glow, but only by pulling out all stops. The Diesels we used burned only three and a fraction ounces an hour. (In ten hours you might fly 300 miles!) Our second test ship can lift enough fuel for 20 hours but, frankly, the Diesel problem is one of carbonization long before this time is reached, which requires an engine adjustment. Since the engine cannot be adjusted in the air any more than you can adjust a receiver once airborne, supreme durations will require you to do some work with diesel fuels. Large props, overheating, lean running, add to carbonization—so technique counts heavily.

Fuel weight is the nightmare. Remembering fine economy from .19 Ardens on gas and oil, the editor (who felt like an interlocutor before the job was done) asked Pete Chinn for a professional opinion. Chinn is the world's foremost writer on engines and knows to the rpm, and the last fractional ounce of brake horsepower, what any engine can be made to do. No doubt the weight of spark coil, condenser, and batteries for ignition, scratched the Arden and gas-oil. Chinn's argument was for the .09 Diesel and, in this, he had much going for him.

Bethwaite had shown that a 10-foot airplane, with a Mills .08, could take off in 600 feet with a 130-ounce gross, including enough fuel for an all day flight. Frank, however, found that he could not keep the plane airborne somewhere after three hours.

The Frog .150 (late 1958 model) engine used was not necessarily selected on the

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basis of being better than other engines and no comparison with any other engine has been made, or intended, on a general performance analysis. Pete simply said, if you want to turn a 10 x 4 prop for at least 12 hours, at 3.3 ozs. per hour, you will have to hold 6600 rpm's. Another Frog was even more economical, one other Diesel (.09) turned an 11 x 4 at 6,000, a 10 x 4 at 7,500, but consumption was 5 ozs. per hour. Smaller props (lower pitches) always increased rpm's, performance, but also fuel consumption.

ROG's at up to 6-1/2 pounds, with a seven-foot airplane, indicates what you will have to get from any popular engine you test. You'll need absolute steadiness of run, no overheating, no critical business when nose down or up, etc. The engine, tank fuel-feed set-up achieved by Chinn is remarkable in that the engine has been run for 13 hours continuously on the bench, running dry the tank, without adjustment to head compression or needle valve, and you can hold the engine three feet in any direction from the tank, above or below, and rpm's do not change audibly. In practice, it was found that we could turn a Tornado 10 x 6 nylon at the same rpm, same consumption, as a 10 x 4 wood prop. At take-off, the engine is adjusted with a Vibractac to turn 6,500. Performance is increased with a 10 x 4 (Tornado wood turns 7,000) but fuel consumption is the governing factor.

Chinn molded a fibreglass tank around a plastic juice container from an American supermarket! Case pressure is used to force fuel from the tank to the engine with a float chamber to control flow on demand. The fuel system, tank, and complete specifications of the powerplant set-up will be detailed by Chinn in next month's installment.

Rosenstock proposed that we build a test job first (any job) to see what the flight problems were. Specifically, this was a light-weight duplicate of an old six-foot multi job that had a wing loading (six years ago) of a fantastic 32 ounces per square foot, with a Super Cyclone engine. So we eliminated the cabin, stuck the engine on top of the nose, out in the breeze, stretched the wing to seven feet and increased tail areas. While the large vertical tail does not seem compatible with spiral stability, it is essential for directional stability when a large span model flies slowly, as it will at times.

Two flight problems were expected. How did you get the ship down from high altitude repeatedly during the flight? And, what kind of a landing gear would insure the very long ground runs without deviating from course. Throttling the engine to control height is meaningless (in this case) on a light plane like this one. Gassed up, surface loading is less than 16.38 by rules, lighter in terms of wing area alone. And we've never closely approached that 16.38 figure—a measure of the reserve for more fuel. The "wingy" ship will be thermal crazy—especially near empty.

Nor did we like elevator control, because of speed build-ups which might overload the ship, set things to jumping, or just cut the engine. Aerobatics were out—but with rudder the ship now can be spiraled widely (inherent) without cutting engine. A flat bottomed "zip" high-lift section was used. It should not work, but it does the job. You can't trim flat-bottomed sections for a steady dive without picking up speed and going back to a faster, flatter flight with less climb, unless repeated trim applications are fed in. We needed

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the flat bottom section, to insure good take-offs. (With flippers you could use a convex-undercamber.) Spoilers proved the answer.

A single-channel receiver is used, operating a compound escapement (with a self-winding motor device), with the third position (more reliable than "quick blip") operating the spoilers by a self-neutralizing escapement. The spoilers work well on a single strand of 1/8" rubber—a loop is more than enough.

Spoilers operate by destroying lift over a vee shaped area of the wing, fanning out behind the spoiler. If trim was available, a nicely controlled, sinking descent, should be possible. In our case, the airplane dropped the nose slightly, would fly somewhat faster, but would never pick up excessive speed. It always held the same angle, did not balloon. The flight path resembled that of a real plane with wing flaps down. Control response becomes real groovy with spoilers out and you can land the airplane fast with power (in emergency), or fairly steep in the glide with spoilers out. A 1" x 4" spoiler will give level flight with empty tank on a warm day with risers. A 1" x 5" spoiler creates a definite descent. Spoilers must be adjusted to empty-weight conditions, as full-load angle of descent might be steeper than desired for a conservative flight pattern.

The landing gear is based on a suggestion by Larry Conover—used by Gurnett on Cargo Clippers. The two wheels are fixed to the axle so that wheels and axle turn together as on a train. The outside wheel in a turn on the ground compels the inside wheel to turn at the same speed. The ship runs remarkably true, and rudder response is better than in the air. Take-offs are child's play under all conditions. There are no struts. The 1/8 wire axle goes through two micarta bearing plates in the fuselage sides. The wheels are micarta disks—no tires. Despite all lack of shock absorption features, the axle has never been bent, or the ship damaged in any way due to the gear, despite stalled landings and mild crack-ups. For our purpose, the gear is perfection. Ground angle has little affect and the wheels are sized only for belly clearance. Light loadings help.

Out of his experience with 30 RC jobs, the editor felt moderately low dihedral would produce a near neutral stability so that the ship could be put in a turn, with the turns continuing without loss of altitude until drift required a control correction. In practice, this was fatal to the first airplane flown under FAI observed conditions for a record try (in order to determine the problems and procedure involved in the real thing). After getting off in 480 feet, the ship flew out to 2500 feet before a turn could be made. At this extreme distance, with less than 30 feet of altitude, turns that required "taking the ship out" led to drastic flying difficulties.

Number two ship had more dihedral, was easier to control at distances, but severe dihedral of at least 10 degrees is essential for hands-off flying when the ship is far out. (Ship hit snow fence after take-off in wind on record attempt). The three-view shows this. With a load of fuel, the first plane was easier to control than when empty. Somewhat like rubber stick jobs, the empty planes have a high CG—too high without dihedral to handle it.

(The first of three articles.)

Supermarine S-6B

(*Continued from page* 18)

tapered. Attach flippers to stabilizer with cloth hinges, using a small Veco control horn. Cement the finished horizontal tail on top of the crutch pieces which are cut down to 1/4" depth to take the tail.

The 1/2" sheet head rest that fairs into the fin is shaved and sanded to the required taper and cross section. When the planking has been smooth sanded, cement the head rest-fin in position and match the contour at the rear end of the fuselage with two soft balsa blocks. These blocks fit on top of the stabilizer, one on each side of the fin. The engine fairing blocks and windshield streamline block are shaped, sanded, then matched to the fuselage and cemented in place.

Floats: The floats on the original model were made of 1/16" sheet bent and formed with the bulkheads cemented in place without connecting stringers. The plans show top and bottom stringers, and chine stringers of 1/16" x 1/8" balsa. Build each float as you would a fuselage. If you worry about alignment, cut the top and bottom stringers from sheet balsa, thus insuring the exact curve. Use the profile of the float for a pattern. Cement top and bottom stringers on the bulkheads, then the remaining stringers. Note the plywood plates to which the brackets must bolt.

Sheet cover the floats before attaching the bow and stern blocks are fitted. To plank, begin with 1/16" x 1/2" balsa

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strips, on the upper halves of the floats, attaching the first strip with its lower edge hanging over the chine as convenient. As each planking strip is cemented on, install a similar strip on the opposite side of the float. As you work toward the top, use narrower strips, such as 1/16" x 1/4", tapering them when necessary, at the ends, to make a fit. Each bottom quarter, forward of the step can be a single piece of 1/16" sheet. Make sure the wood is a pliable grain and, if necessary, moisten it for easy bending. Do the same thing to the rear of the strut. Note that the brackets must be bolted to the plates (2-56 machine screws) before the planking makes this impossible.

Shape and attach the prow and stern blocks, then sand each float to a smooth finish.

Finishing: All surfaces are coated with balsa sanding sealer, and fine sanded. The fuselage, wing, floats are covered with Japanese tissue. Give all surfaces several coats of thinned dope to fill the paper, then use colored dopes as marked for the color scheme. Use one-inch decals on each side of the fin, reading N 247, in black numbers. Use a 1-1/4" aluminum spinner. On the Torp .09 in the original model, a Tornado 8-3 prop was used. Make dummy oil-cooling radiators out of 1/16" sq. balsa, starting from front of plane (not spinner). There are four of these strips, outer edges sanded round.

Flying: If plane dives or does not fly straight at same throttle setting, add weight to spinner; make back of spinner about 1/8" or 3/16" thick. This should be done on a lathe. Use cold-roll or brass. This also helps engine idle better. If airplane does not take off in water 15 to 20 feet, check alignment of floats; they should be parallel within a 1/16".

The motor should idle slowly, otherwise plane will not lose flying speed and you cannot make a good landing. If inner float wants to dig in water in take-off, reduce control line tension. Take-off is made with full up elevator.

Length of control lines is from 17 to 35 feet. At first I suggest 20 foot control lines.

Line length depends on engine used, and, as given, allows for .09 or a .15. If a .19 is used, the flier will have to use his own judgment.

Foreign Notes

(*Continued from page 2*)

and model flying in Denmark, an annual lottery is held. The scheme seems to be very successful and it is reported that upwards of 120,000 tickets are sold each year, with cars given as top prizes.

Organized model flying activity in Denmark is spread through about 50 model clubs, with an average membership of 20 modelers, under the auspices of the Royal Danish Aeroclub. Every year, a summer camp for model builders is held and special courses are arranged for club instructors. Officially recorded contests number around 50 per annum and, of course, are held to FAI rules. (It is worth recalling here, that the Nordic A-1 and A-2 class gliders were, in fact, pioneered by the Danes.)

As regards modeling supplies, Denmark has one sizable and long-established model firm, Dansk Modelflyve Industri (D.M.I.) at Odense, which makes the Viking .049 and .15 model Diesel motors, also free-flight, control-line and boat kits, props, tanks and fuels. Not very much stuff is imported, due to a rather heavy tariff on such items, although some D.M.I. kits are exported—notably to Germany.

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1/16x1....	5¢	1/32x3....	16¢	3/4x3....	75¢
3/32x3/32	4/5¢	1/16x3....	16¢	1 x3....	1.00
3/32x3/16	3/5¢	3/32x3....	18¢	1½x3....	1.25
3/32x1/4	2/5¢	1/8 x3....	20¢	2 x3....	1.44
3/32x3/8	3¢	3/16x3....	25¢	3 x3....	2.18
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3/32x1....	6¢	1/32x4....	25¢	1 x4....	1.30
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1/8 x3/16	3/5¢	3/32x4....	25¢	2 x4....	1.92
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1/2 x3/4	16¢	3/32x3....	14¢	3/8 x1/2	16¢
1/2 x1....	20¢	1/8 x3....	16¢	3/8 x3/4	18¢
5/8 x5/8	16¢	3/16x3....	18¢	1/2 x1/2	18¢
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No. 16	1/16x 2½	No. 105	5/8x 5
No. 30	1/8 x 2	No. 107	5/8x 7

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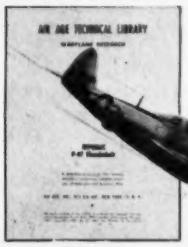

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new version of the well-known small Tiger engine, called the Tiger Jet M-2. The new model is very slightly shorter and lighter and, instead of the usual spark-ignition system, features a special heavy-duty glowplug to eliminate the need for a trembler coil for starting.

The valve-head assembly is of completely revised construction. Instead of a one-piece valve head screwing into the front of the combustion tube, a la Dyna-Jet, a shorter and lighter head and separate, spun aluminum venturi choke are now employed. These are flanged and clamped to the combustion tube by a wide, alloy locking-ring, to which a neat red anodized spun cowl is riveted. The glowplug is of a special type, requiring four volts and has part of the body cut away to expose the large, 5/16-in. long filament. Overall length of the motor is 17⅞ inches and the checked weight was 6.9 oz.

The O.S. company have a further improved model of the well-known Max-II 35 engine, which we are at present in the process of testing and which will be released to distributors early in 1959. It is basically similar to the Max-II type first introduced in 1957, but has its shaft journal diameter enlarged by 2 mm. to permit opening up of the induction system for increased power. The shaft is, in fact, just about the biggest (13 mm. or slightly over ½-in.) employed by any current 35 engine. A new casting has been made necessary to cope with the increased bearing size and the whole unit is really rugged. It weighs 7.6 oz. At present designated "New Max-II," the 35 will be followed by a companion 29 model in due course, also having a similarly revised case and shaft.

The O.S. throttle assembly for the Max engine has also been improved. As is already known, the Max Multispeed engines feature a rotary exhaust restrictor coupled to a butterfly intake valve and whereas these were normally operated through a lever moving in an arc at the rear of the engine, additional coupling is now provided at the carburetor to work the linkage via a horizontal push-pull rod. The new lever is fitted with a set screw to permit ready adjustment of the linkage.

SWEDEN

The 1958 Swedish Free-flight Championships were held at Uppsala on Sep-

Ivan Ivannikov, Russia, won jet at Brussels—then set world record of 186.4. Fifteen nations competed at Brussels in the C/L Internationals.

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tember 14, in sunny weather and light wind. Hans Friis, of Gamen, Norrkoping, had the highest score of the day, two seconds short of a perfect five-flight maximum, to win the FAI gas event. Borje Magnusson, of Klippan, won the A-2 glider with a score of 14:40. In the Wakefield rubber class, Rune Johansson (3rd in the 1958 World Championship) lost by one second to Charles Moberg of Goteborg.

The Swedish Championship control-line events were held three weeks earlier at Nykoping. Here, Jesper von Segebaden won the stunt contest convincingly with a Fox 35 powered Smoothie. Top time in FAI speed was 189 km/hr (117.4 mph), with a .15 cu. in. Super-Tigre G.20 glow engine, by Mans Hagberg of Stockholm.

IN BRIEF . . .

Norway . . . Norway was the host country for the 1958 Nordic Free-flight Championships, held between Norway, Finland, Sweden and Denmark. The contests gave a clear win to the Finns, who placed first and second in all three events. Sweden took third place in Wakefield rubber and FAI free-flight gas, with Denmark third in A-2 glider.

West Germany . . . We hear that Johannes Graupner, the Taifun engine manufacturer, may bring out a flat twin .29 Diesel for RC work. Improvements have been made to the Taifun Hobby-RS .06 cu. in. reed-valve Diesel which was a little troublesome as originally designed.

East Germany . . . Schlosser engines (one of them won the 1958 World Championship for Hungarian Erno Frigyes) are out of production. Designer/builder Benno Schlosser is reported to have moved to West Germany.

Italy . . . Italy's leading engine manufacturer, Super-Tigre, now has one of the largest engine ranges of any manufacturer —14 models, ranging from .06 to .60 cu. in. displacement. Smaller Super-Tigres (.03 and .049) have been discontinued. Many American, British, German and Japanese engines are now being imported into Italy.

Czechoslovakia . . . Latest to win Czech title "Master of Sport" in model flying is Frantisek Pastyrik. Pastyrik first achieved prominence in the 1957 World Speed Championships, when he came near to challenging the mighty Sladky with a speed of over 129 mph.

Toth and Beck, Hungary (again!) first, second, FAI Speed Championship, Brussels. Winner clocked 134.2 mph with a special .15 engine.

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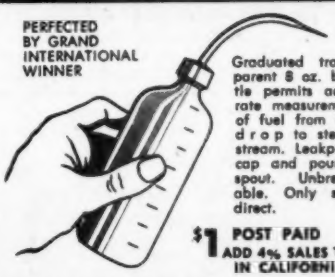

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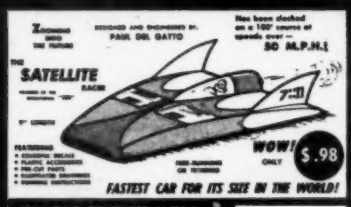

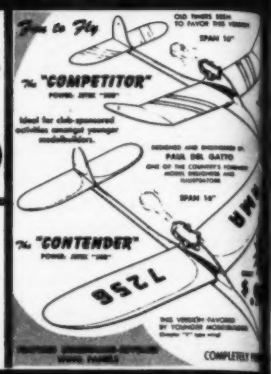

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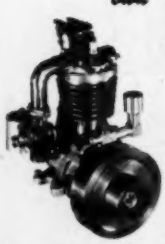

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OCTURA MODELS
P.O. Box 536 MN Park Ridge, Ill.

Portugal . . . Witnessing a control-line meet at Lisbon during the summer, Keith Boyer of Norfolk, Va., was intrigued with the habits of local modelers. For one thing, they actually arrived properly dressed in coat and tie. Most appropriately, two contestants from Oporto, in the wine country, carried their fuel in a rattan covered wine jug! The meet, organized by the Portugese Aero Club, was held at the Puerto Aeroporto on the fine, wire-fenced, permanent C/L arena there.

New F.C.C. Regulations

(*Continued from page* 29)

the loading of the antenna, the MOPA type transmitter is much more likely to stay on the frequency it's supposed to transmit on. Not only is this advantageous to the modeler, to have a transmitter that is stable on the frequency the receiver was ground-checked to, but the MOPA type transmitter is more likely to stay within the new tolerances specified for our frequencies by the FCC.

At this point, let us make one thing clear. The FCC specifies in Part 19.33 of the Rules for Citizens Radio Service that "The *carrier frequency* of a station in this service shall be maintained within the following percentage of the authorized frequency:" The italics are ours. They say nothing about *crystal* frequency tolerance; they specify by their wording that the signal we put out must be within tolerance. In this respect modelers have in many cases been getting away with r/c murder for these many years. Our tolerance was (on just 27.255 mc) .04%, it has now been narrowed down to .01% for less than three watts input, and .005% for three to five watts input to the final stage of the transmitter. Since wattage input is a matter of volts times milliamperes to the tube connected to the antenna or output stage, most hand-held transmitters fall under the three watt limit (135 volts times 15 to 20 mils) on the .01% tolerance, but the "big black boxes" that use 180 volts and 20-28 mils of current need to be controlled to within .005%. (Frank Hoover, of CG, states that the firm's crystal tolerance always was .005.)

The crystals we have been using under the old .04% tolerance in many cases, if run "cool", will result in a signal within .01% or even .005%. International Crystal Manufacturing Co. of 18 North Lee Ave., Oklahoma City, Okla., wrote us recently, "The .01% crystal can be marketed and so stamped, however, the guarantee will be valid only when the crystal is used in our recommended circuit. Since the circuit plays a large part in the operating tolerance obtained, you can readily see it is quite important that the crystal be used in a circuit similar to the circuit in which it was processed. The .005% crystals will be sold only with the oscillator. This will insure that the unit is used in the proper circuit and the tolerances then can be guaranteed.

"Our experience in the past," International continued, "has taught us that it will not be practical to guarantee .005% tolerances when the crystal is used in just any circuit. Most of the present radio-controlled transmitter units in the field operate the crystals at a very high level and we feel considerable difficulty will be had in some of the transmitter units. It is quite possible that the standard .005% crystal would work in others, however, the circuit must be considered and the user should know his circuit or depend upon an entirely new unit with guaranteed tolerance for operation." For what it may be worth, though at

(*Continued on page* 56)

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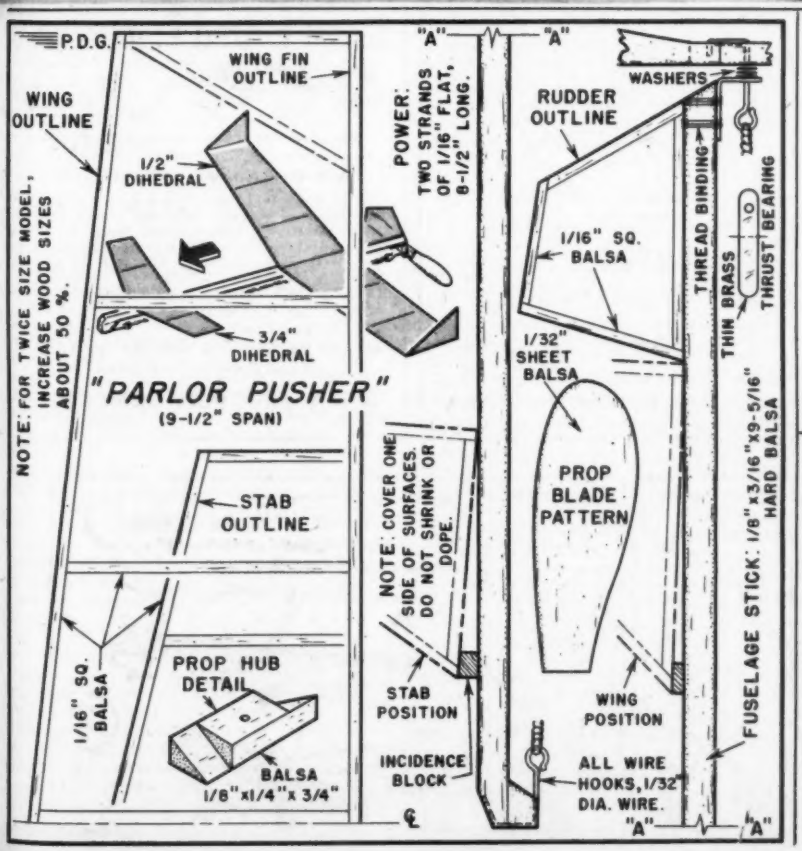

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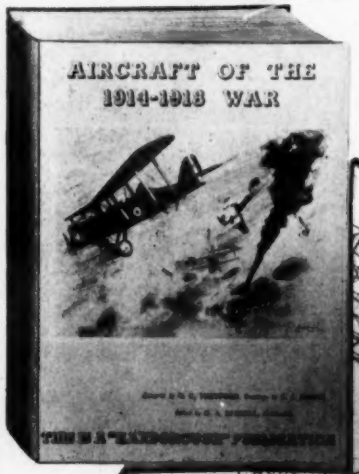

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present we see little use for it since other services are allowed high power on that frequency, the FCC now allows us to use 30 watts on 27.255 mc only.

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Paul Runge of Ace R/C (Box 301, Higginsville, Mo.) writes that "All crystals that we have in the house now and all crystals that we have shipped out in the last two years meet the .005% when used in the Commander or the WAG or most of our transmitters. I'm not sure about the Mac II, but the Lorenz MOPA very definitely is. . . . We plan to carry no .01 crystals. All of our crystals will be .005. The Wright crystals at 27.255 will still carry the $2.95 price tag, while the Wright 26.995 will carry the price tag of probably $3.95. The Petersen crystals which will be available from Petersen in all of the frequencies, will carry a consumer net price of $5.50. This includes the 27.255 as well as any of the others. For the time being we will carry only 26.995 and 27.255 crystals. The others will be placed in stock as demand warrants."

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YES SIR
WELL WHAT DO YOU SUPPOSE THIS TIME IS
WE'D BETTER FOLLOW HIM
JUST THINK - I'LL BE FAMOUS THE FIRST MODEL AIRPLANE FLOWN ACROSS THE PACIFIC!
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?

are the same as the cases of the Peterson Z-9 and Z-9A types. Their catalog is a free education in crystal manufacture and use.

Berkeley Models, Inc., (West Hempstead, N.Y.) has in stock crystals for all six frequencies that are the same as the Peterson Z-9A cases (.050 dia pins); are available for $3.95 each.

The FCC has ruled that we be allowed to use any of our six spots around 27 mcs at will. In other words, a fixed frequency will not be assigned to you when you file for a station license or renew an existing one. This allows us the flexibility, with the newer selective equipment, to switch from one frequency to another, in order that more than one fellow can fly at a time. However, don't get the idea that as long as you're on tone, you can use the Class D frequencies . . . the FCC covered that in Part 19.34 by stating about Class D, ". . . whose sole function is to establish and maintain voice communications between stations." The advantage to this flexibility they allow us is that you can have more than one crystal in the oscillator stage of your transmitter, switch from one to the other on the field if six fellows show up at a flying session. Essco already has a transmitter that will allow a crystal for each frequency, with an external switch to change from one crystal to another.

Some hobbyists will glumly ask "Has the FCC given us so much?" The answer is in how you look at it. While we have a few more restrictions, we have the opportunity for much more fun from the hobby, we've been given the opportunity to "get away" from the high-powered traffic light transmitters on 27.255 mc and generally the development of the hobby will progress. With only one, possibly two if one is on 465 mc, able to fly at a contest at a time, the natural field of development has been along the lines of more controls, only. This has meant that the more money a modeler had the more he could do with a ship. With the imminent appearance of inexpensive simultaneous flying, there will certainly be more fun in flying. To those gloom-dispensers who feel they can't get away from the traffic lights at 250 watts on 27.255, such as the station near us at Hicksville, Long Island, by using a 26.995 rock, suppose we quote some of our experiences and tests. We've had a 26.995 mc crystal since the FCC first proposed the change in 1957. Our house is eight miles as the crow flies from the transmitter. One night we hooked a sensitive super-regen Hill-Essco twin hard-tube receiver to one side of the TV antenna, tuned to 26.995 mc, and sat and waited for the Hicksville station to come on. No signal tripped the escapement in the ship we were using for a test. The distance, plus the difference in tuning, eliminated the interference—on the ground, at least. Granted, that on 27.255 mc, the same as the traffic control station, the rudder stayed over as long as the station's carrier was on. Then another time, we were only six miles away from the Station with a ridge of hills 170-odd feet high between us and the station and we flew on 26.996 mc without interference or trouble. At four miles away, the local King Kong blanked off the tone signals with its carrier when the receiver was tuned to 26.700 mc. Obviously the new lower frequency of 26.995 will help those within 30 miles of the traffic control transmitters which is the estimated maximum interference range and narrow that down to 10 miles or so. Since r/c modelers drive 10 or more miles and think nothing of it to get to a field they like for flying, the problem seems to be much reduced by the new frequencies.

While there was a good possibility of 465 mc equipment being made useless by the closing in of tolerances, the FCC has been very specific in leaving that spot as it was. No changes have been made and both the Babcock and Macnabb equipment may be licensed or relicensed as in the past. Backing up our contention of more fun on our new 27 mc frequencies with more than one ship in the air at a time, for some time now we have known of fellows who fly the Babcock 465 tone equipment two-at-a-time, one on five kc tone, the other ship on 7 kc tone. (One transmitter will fly both ships, but this has proven awkward!). The only change to 465 mc equipment is to the higher-powered stuff, where they've chopped the power that can be used on that frequency to five watts maximum instead of the former 10 watts. The model equipment is down at three watts or less, so what that does in effect is reduce the possibility of interference. Since for maximum range, the 465 mc antennas should be pointed at the planes, where the reflector bars of the antenna direct the most power, there is little possibility now of 465 being interfered with at any time.

One "sleeper" in the revised regulations is something we had all better do something about. The FCC now specifically requires all Citizen Radio Service transmitters to leave the air in event of a Conelrad Alert, either as a C.D. drill or an actual operation. All the broadcasting stations carry Conelrad Alert warnings, then swing into the "mixed operations" involved in Conelrad broadcasting. Your car radio or any portable will do the trick and you can listen to the ball game while actually monitoring for an Alert.

Carefully considered, these new FCC regulations do add to our responsibilities, but the avenues for improvement in r/c modeling that they open, make the slight extra trouble well worth while. Just for example, we can continue to use all our existing equipment without change, and for a few dollars, we'll soon be able to put a front end on our existing receivers that will allow simultaneous flying of up to a half-dozen airplanes at the same field. We think it's well worth it.

Satellite 600!

(*Continued from page* 11)

cap rests at L.E. and T.E. Remove cement excess. Spars, gussets, braces, and center ribs are added in that order. Cut spars by same method as wing. Allow to dry. Remove pins holding L.E., and shim up 3/32" full length; pin again, keeping front spar well pinned down also.

Cement top caps and allow to dry completely. Remove from plan, sand, cover with Japanese tissue, water shrink and allow to dry. Dope as per wing. Fuelproof if butyrate is not used. Keys and rudder added later.

Rudder: Solid for .02 through .09 but sizes are given for built-up rudders from .09 up. Cement outline together on the plan, less bottom cap, and allow to dry. Taper spars equally from each side. Remove outline, cement cap rests to inside center of L.E. and T.E. Pin spars in place, cement both bottom caps in place at same time so curve holds. Check now for true curve and symmetry. Allow to dry and install remaining caps. Sand. Before covering, place a sheet of sand paper flat on stab in center, sand side up and holding the rudder at the L.E., in its correct position, move the T.E. back and forth rapidly, to fit. Be sure rudder is vertical. Cover with Japanese tissue, water shrink, dry, and dope.

Complete assembly. Cement front and

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rear keys in place first. Offset rudder 1/32" to the left at the rear. After drying, hold-down wire may be spread apart, slipped over rudder near stab joint and pressed together, with points going in the rudder. Run cement bead along wire at junction of rudder and stab.

Pylon: Solid sheet through .09; built-up, .19 through .60. Built-up pylon consists of pine center bar which runs the length of the pylon at top and acts as a rubber hold down, as well as a strengthener. Laminated sheet, front and rear, grooved before laminating to accommodate center bar—planked center over straight separators.

To construction, groove sheet for center bar, fit and check for accuracy. Laminate sheet, installing center bar at the same time, pin to plans for line up and installation of center construction. Remove from plan after drying and plank. Do not sand until fuselage is constructed, and pylon fitted to fuselage. (Note: Pylon laminations may be constructed of three laminations; ¼" sheet inside, and ⅛" sheet outsides. This method will eliminate necessity for cutting groove for center bar.)

Fuselage: Lay out straight, hard longerons, either of full length stock or spliced. Cut all diagonals and uprights for both sides at once, and build the second side directly over the first. Cut three rectangles of heavy sheet to the width of the cross braces in the front view, and a little deeper than the fuselage. Cut twelve cross braces to this width, six of these being double depth for the pylon to notch over. This covers stations A through C. Clamp fuselage together at rear, aligning carefully, and using rubber bands around the fuselage A through C, using the rectangular spacers to hold fuselage apart. Cement the cross braces A through C.

Cut firewalls, spoke mounts, stab platform, and bulkhead at station E of plywood. Release tail clamp, install ply bulkhead at station E and hold with rubber bands. Alignment must be checked. Add remaining cross braces to natural fuselage curve and allow to dry. Bring rear of fuselage together, cement and clamp. Laminate sub-fin. Side stringers are constant depth, as in front view, stations A through C, tapering to ⅛" depth at station E. Cut tapered sections from sheet, using straight edge, by spar method. Splice stringers forward of station C. Use spoke mounts to align and space at front. Install top and bottom stringers, being sure that the top stringer comes to half way point between station C and next cross brace aft. Cut notches in pylon to match cross braces and top stringer. Notches are equal depth front to rear. Install pylon side rails on fuselage from station A to rear of pylon and while wet, slip pylon between, press together, line up pylon, and pin rails in place. Pencil mark pylon, at top of rails, slip out of slot, and sand pylon completely, to rail line. Remove sub-fin, sand to shape, and install wire skid hold down. Attach to ship.

Secure 3/48 bicycle spokes to spoke mounts by drilling 3/48 hole far enough aft so that when spoke is slipped through this hole, the threaded end will go through the firewall and the timer tank with enough room to spare (about ¾") for the spoke nipple. Drill or make pin holes, each side of spoke, through mounts, and secure spokes to mounts with serving wire or thread. Cement solidly. Install mounts and firewall, noting spacer rails in front view between fuselage and mounts. If timer tank is slipped over spokes at this time, and tightened slightly, line-up is simplified, and spoke mounts come flush to firewall. Plank-

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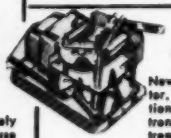

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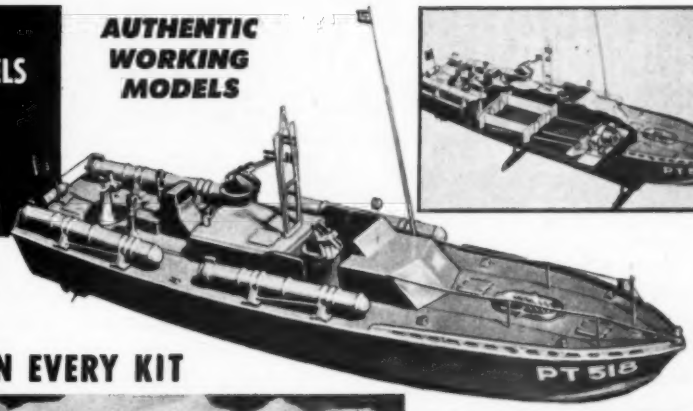

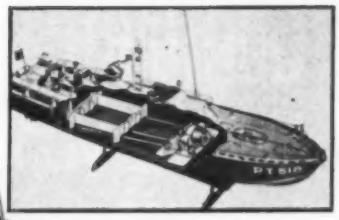

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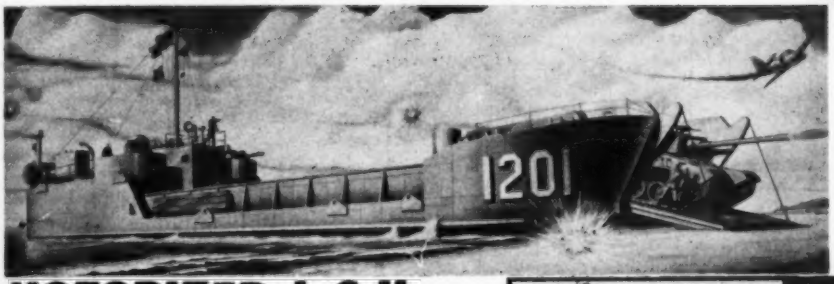

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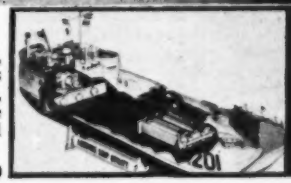

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ing: Front, vertical; rear lengthwise.

Cement longeron caps, and inset into planking, front and rear, on all outside surfaces of longerons (eight caps). Allow to dry. Sand fuselage. Flat sanding blocks, preferably 12" long and 3" wide, round dowels from ¾" to 1" dia., with contact cemented garnet paper of various grades, allow perfect sanding cuts. Do not sand stringers excessively—just bevel at same angle as longeron caps. Install pylon, lining up and cementing securely. Pylon platform is straight with radius edges and corners (front view). If more streamlining is desired, symmetrical fillets may be added on each side of the pylon, top and bottom. These are made of 3/32" sheet, ¾" wide, pylon length, flat on one side, and beveled to a feather edge on the other, all around from center. Point each end and curve symmetrically. Coat heavily with cement on feather-edge side, press into place, wipe cement from edges, pin, allow to dry over night. Finish sanding.

Fuselage is silk covered, wet, in one piece, excluding pylon, starting from bottom stringer, up and over. Make a cut midway for the pylon before starting. If ship is pre-doped, wet silk may be stretched, pinned in place on bottom longeron, and thinner brushed through for adherence. Cover pylon with two pieces of wet silk, cut to ¾" over outline. Fillets covered separately. When covering is dry, dope at least five coats, 50/50. Platform is silk covered also. Fuel proof if necessary.

Add stab platform, and make dethermalizer wire from U-control leadout cable, available in short lengths. D.T. (dethermalizer) wire should be 6" long, with a small loop at each end to slip over hold-down wires. Use of a small piece of fuel line over the hold-down wires, after D.T. wire is slipped on, holds it in place.

The "29" B&B Timer Tank is available at some hobby shops, or Holland Eng., 12926 Saticoy, N.H., Calif., at $1.75 ea. Adapter rings for mounting a .19 or .23 are available at most hobby shops. If larger engines are desired, this tank will fit most three-hole, radial mount .29s with no change. Johnson .29, .32 and .35 requires the radial holes in the engine be drilled through, and ovaled in toward the center point of the back plate, to allow 4/40 machine screws to pass through from the front and line up with the pre-threaded holes in the timer tank.

File tank lip at rear of tank for L.G. (landing gear) wire to test on tank back plate (two slots ¾" wide). Make the gear of ¾" wire, in an inverted U shape, bent in ¾" at wheel position for brass-tube axle to slip over. Put wheel on axle and solder to gear.

Pre-flight: Wing should be keyed. Lineup is best with stab on ship, for perfect alignment. Testing is much more certain with everything keyed in place. Surfaces can be moved by cutting keys and shimming other side, if necessary.

Check surfaces for warps. These can be removed by three methods. Twist over steam, low flame (hold high above) or hot auto exhaust at the flying field. Looking from rear, the wing should be washed out (T.E. up) at both tips, because it was built in, and the left in-board panel washed out ¾" at outer dihedral break. Right inboard panel and center section, true and flat; stabilizer true and flat.

Check balance against C.G. (center of gravity) on plan. Tilt stab with 1/32" ply shim for left glide (left side higher looking forward). Glide check, noting any tendency to dive or stall, correcting by shimming

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54. SATELLITE: Hunter's FF, .19-.35. SUPERMARINE S-6B: U/C Scale, .09-.15. Satellite is top contest free flight '58-'59. Schneider racer, S-6B seaplane is one of FAST club's best projects.

1. GIMLET: RC Low wing .049. ROYONO: Contest FF A&B. **So low wings RC are new? Gimlet started it all!**

2. COMPER SWIFT: ½A, FF, Scale. MULVIHILL WINNER: Rubber. THE LIEUTENANT: UC Stunt, .29-.35. **If it's scale you like, the Swift is a wonder!**

3. BUSTER: Rubber, Sport THIRTEEN: UC Stunt, .29-.35. VOUGHT SBU-2: UC, Scale, .19-.29. **Buster. Ideal for beginners on way up.**

4. SURE FUN: UC Sport, .29-.35 PROFILE SILVAIRE: FF Profile, ½A. ZEPHYR: Rubber, Fuselage **Control line on floats. Sport Gassie.**

6. HIGGINS CABIN CRUISER: RC Boat, .09-.19. FOKKER D7: Scale, U/C, .29-.51. **The great all-time favorite? Try the Fokker D-7.**

7. WORLD CHAMP GL.: Nordic Winner. HI BOY: Cabin Stunt, Palmer-Goyet, .29-.35 POW WOW: Bob Palmer stunt, .29-.35 **Collector's item—two Palmer models!**

8. GEE BEE: Scale U/C, .19-.25. DRAKE: FF, flying boat, .049. DURANITA: FF, bipe, .049. **More people built the Drake than any other ship.**

9. AEROCOM'DER: Scale, U/C, 2 .15. MARS: Bob Palmer stunt, .29-35. NOBLER: Aldrich's Nats Winner, Stunt, .29-.35. **Palmer and Aldrich, plus a twin ukie. Imagine!**

10. SMOG HOG: Bonner's Multi RC, .19-.35. STRATOLINER: 2 Half A, U/C. GUARDIAN: U/C Scale, .29 up. **Greatest Multi RC of all time—a beauty!**

11. GAMBLER: Mirror Stunt Winner, .29-.35. DOUGLAS B-66: ducted fan FF, .049. **B-66, the ducted fan job that beats all others.**

12. WHIRLING WINGS: Sikorsky XH-5, .15, 'copter. BREEZY: Small field RC, .049. SPITFIRE: Stunt, semi-scale, .29-.35. **P. Schoenky, 'copter master-his Sikorsky!**

13. T-CRAFT: FF scale, .049. FENO: Combat, stunt, .29-35. PADDY'S WAGON: Contest FF, .049. **Paddy's Wagon—one contest job ok for beginner.**

14. HEATH PARASOL: RC, FF, Scale, .075 .09. GUARDIAN: Nats carrier winner, .29's. SHARPIE: FF Sport, .02-.049. **—Guardian a dilly.**

15. RE-8: WW1, U/C. .29-.35. FLAPPING WINGS: Rubber, ornithopter. BOOMER: FF, sport, pusher, .049. **Can planes fly like birds? Ornithopter sure does.**

18. PAACKHORSE: PAA Load FF .15. AIRNOCKER: Scale, FF .049. **What model hit the jackpot? Airknocker—the Champ.**

27. FLAMINGO: RC Amphibion, .15-.23. UPSTART: Best B-C FF, on .29-.35. **NACA planing hull make Flamingo stand-out RC. UPstart—it goes!**

40. MUSTANG: U/C Scale, .29. BI-GONE: Sport, FF, ½A. GLIDERS FIVE: HL Sheet. **Mustang, Jim McCroskey's Nats winner. Bi-Gone, nifty bipe.**

43. EQUALIZER: .15 to .19 multi, RC. QUICKIE TRAINER: Speed, .29. AMAZOOM: FF, contest, .15. **deBolt's best, the Equalizer? Amazoom—Stan Hill's hi-thrust.**

44. CONVAIR'S DELTA: Jetex FF. LIL DYNAMITE: .15 stunt, UC. SWAT: ½A, FF, contest. **A trio of exceptional planes.**

45. ASTRO-HOG: Multi RC, .29-.35 MITCHELL: Profile, .09's, .15's UC. **Dunn's low wing radio—tops! Nothing matches this multi. The Mitchell a fine flier.**

46. PROPJET B-47D: U/C, .15's. RUFFY: Stunt, .29-.35. NOR'EAST'ER: Nordic glider. **B-47D, beaut of a project Ruffy: big winner—it's new!**

47. FOKKER E-3: 1/2A, FF, Scale. NAVY RACER: Rubber, semi-scale. WOODY: .29-.35, UC Combat. Hot! **E-3, beautiful model, fine flier.**

48. SPORTCOUPE: .09, U/C, Stunt. WHATIZIT: .35, Combat, Wooten. SWIF-F-FT: Jetex, two sizes! **Whatizit, settles fuse-wing debate!**

49. CONQUISTADOR: .29-.35, U/C Stunt. TWO-STAGE ROCKET: Jetex (2). **Stunter is a thing of beauty, and it flies as well as it looks!**

50. DUMBO: PBY Scale, U/C, .19's. FRENCH OLDTIMER: 1914, ½A, FF. **Dumbo, the Catalina, man-sized ukie, takes off, lands on water or ground.**

51. AMERICANO: .15 FF, by Blanchard. BOMARC: Scale, Jetex, missile. CUTLASS: Sport U/C, .049's. **Scorpion power makes Bomarc terrific flier. Americano is National Champ's very latest.**

52. GAUCHO: RC Stunt, .29-.35. THE CHAMP: Best U.S. Wakefield. LAIRD SOLUTION: U/C Scale, .15-.23. Gaucho, Argentine Champ, does pattern inverted. Champ, a single Wakefield.

53. SNAP: Sport U/C, .19-.23. PELICAN: PAA Cargo, .049. WINDMILL: FF, 'giro, .02-.049. **For proto take-off and landing realistic Snap tops 'em all. Other two, collector's items.**

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30. Great Lakes Trainer, Triple Threat RC
32. Mig-15, Fifinella, Coquette
33. Skyraider, Dunwoody's Nordic, Flexi-Bull-R
34. Corben Super Ace, Cessna 310, Profile Lightning
38. SE-5, Curtiss Robin, Nobody
42. Tenderfoot, Big D, Westwind RC.

L.E. or T.E. of stab only. Slight left turn should be noticeable in the glide with this adjustment. Be certain the engine has right thrust as noted on plan, and rudder, also noted, is set 1/32" to the left at the rear for left turn in glide.

Power: I find that the use of a plug with idle-bar and low grade fuel for test flights is very effective, allowing a rich setting without cutting out.

With a 9/4 prop, on frontwards, start engine and idle down until engine will merely continue running without cutting out. Use a fuse, since too many ships have been lost on test flights. Launch, using full run from timer section of tank. This will allow observation of the power tendency which should be a right turn of about 10 to 20 deg. and also allow a slow cut-off in a level position, so that the glide may be studied for any stalling or diving. Slightly increase power each time until full bore is reached. A VTO using a standard plug, and hot fuel, should be possible now.

The Satellite will hold a near vertical climb from a VTO, with a slight right tendency, leveling out without stall.

MAN at Work

(*Continued from page* 4)

things just so, sand them like Carl Goldberg making an indoor model, frowns at the terrifying sight of a wrinkle or a bump of cement. Pa will wield the sanding block and say, "See like this!" How many "see like this" demonstrations add up to a model built by pa? An old boy scout ourselves, MAN at W thinks it unlikely that Dad, the old villain, will sit in the cellar making crates for Joey who is off playing Little League ball. Joey sure won't be in the cellar if pa is doing all the building.

Don't take kindly to protests in general. Nor to the degrading professional jealousy that must be behind the catty remarks many people make about others who have the winning habit. And from good guys who know better. A little rumor gets as much mileage as a Volkswagen. Rash accusations mark you stupid when the showdown comes. The old man should have enough sense to be honest. He knows the score, even if no one else does. It is to be presumed he wants his kid to be honest, too.

• • •

► How thick should a stunt model wing be? Pontifical statements support everything from 10 to 20% thick. But until Vern Clements (SNAP, December 1958 MAN) came along, arguments consisted of the same material that blows back from a propeller. Slipstream, if you must be technical. Wind. Not that Vern has settled the argument—we suspect that old wounds will be reopened—but it's tough to argue with the scientific approach.

Using K & B .23's for power, with the same CG's, fuel, etc., Vern and Arnold King, built two Snap's, identical except for one thing. Vern's had a 10% thick NACA airfoil, while Arnold's had an 18% section. (Both sections, plus a 12% section were given on the Snap plans.) Local modelers observed the tests and their opinions were combined here with those of the two fliers. Four people held stop watches.

To get around differences in piloting technique, the fliers swapped planes. Finally, both ships were flown in the same circle, at low-speed throttle to get into position for full-throttle acceleration and speed-dash comparisons. The boys played "follow the leader" through steep climbs, dives, and turn radius comparisons. At dark on each day of a week's tests, all hands would put their heads together, comparing observations, pooling thoughts, and then blundering home, as Vern puts it, "muttering to ourselves in the dark."

Long-hair designers claim that at least two-thirds of the drag of the airplane is in the wing—others argue that a streamline section won't increase drag much with thickness increases. The fact is that a 10% thick stunt airfoil is only four mph faster than the 18% thick job.

Thick sections are more maneuverable—everyone believes this, natch. Yet, there was no extreme difference here between the two Snaps. There was a "slight tendency to believe" that the thicker winged job maneuvered more smoothly, but none of the dedicated witnesses or flight crew could be sure.

Acceleration? Slightly more for the thin wing. Landings? Well, now. The thin-wing ship lands more smoothly.

• • •

► Nogy. That's the name of a wonderful film about airplane modeling to be released in January. This is no canned publicity job by hired hacks but an honest-to-goodness movie, the best ever, the brain child of Paul Gilliam. The truth is not believable, says Paul, who gives us what he called a "Land of Prunes" release. We've double crossed the old boy. The truth: In 1956 Paul was assigned to do a picture story for Marlon Brando on a planned motion picture and got to chatting with Mr. Brando, producer George Englund and writer Stewart Stern about the possibility of doing a full length motion picture dealing with model aviation and a little boy. It was possible that such a film could be made but eyebrows raised about the possible entertainment value to the general movie going public who knew nothing about model airplanes. It went this way for two years. Then Gilliam met a Robert Dorff. Dorff was not a modeler, but believed that a good story about a boy and model aviation could have general entertainment value. With this idea as a guidepost and every nickle they could scrape up, the project began in January 1958.

For two months, they held nightly writing sessions. When they wrote themselves into a corner they were bailed out by Stewart Stern, the famous writer who scripted "Rebel Without A Cause" and "The James Dean Story."

While on the Brando assignment, Paul went to Dallas to shoot the 1956 Nationals for MAN. Old friend, John Nogy, was there with his son Kent. They had found the star in young Kent Nogy. Paul told John that we would like to use his boy in a film with a flavor of model aviation. John Nogy offered the proud-father-like thank you, but with a skeptical look.

In 1957, the Nogy's moved from Denver to Canoga Park, a suburb of Los Angeles. Now, they had the star in southern California. They wrote the story around young Kent Nogy, now ten years minus four months. The big problem was to finish before the boy became twelve. They are finishing before he became eleven, which by some standards in the motion picture industry is Dynajet speed.

As we write, "Nogy" is in the final shooting stages, by Studio Graphic Productions, which is Paul and Robert Dorff. The San Valeers Model Club went all out to put it over. Guys like Bob Hunter, young Nogy and his Dad, Bob Holland, and Johnny Adikes got up at 4:30 on weekends to work at boom operating, script supervising, production managing, lighting, etc. Nats entrants who met the Nogy's at Glenview have written to everyone and his cousin, causing much confusion. Mail should be addressed to "Nogy" Studio Graphic Production, 608B Avenue Martel, Hollywood, Calif.

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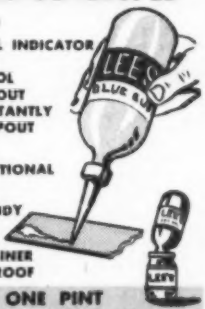

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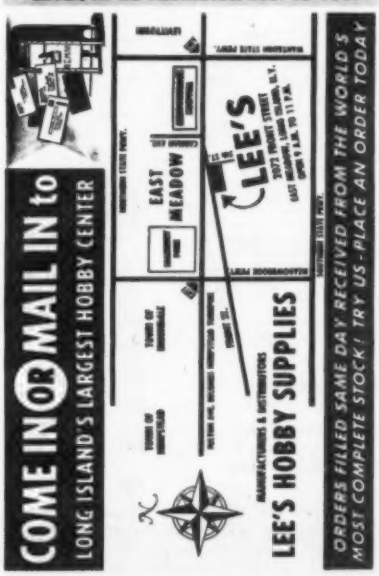
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3 Blade Tractor	
5-3, 5-4, 6-3, 6-4	50¢
3 Blade Pusher	
6-3	50¢

GRISH BROS. St. John Indiana

MORE THRUST from ENGINE TORQUE

Bulletin Board

(*Continued from page 7*)

was building up. Just before the rain started and while lightning was flashing all around, one of the chaps started a flight. A flash of lightning fairly close. A flash of light traveled down the control line. The plane pranged (Canadian for clobbered). The flier was not hurt, but he was most certainly in a rather stunned condition. You may be sure that I have not flown during a thunderstorm since." AND STAY AWAY FROM POWER LINES!

• • •

Ravin Cajuns (New Orleans), copies of their "Dope Can" . . . mimeographed, several pages each, lots of local news. Two items particularly noteworthy: No. 1, a compliment to the stick-to-it-ivity of the Baton Rouge Junior Chamber of Commerce, whose contest was hit by really foul weather . . . "The officials were standing ankle-deep in water . . . etc."

We wonder just how many contestants at any meet ever realize what a job the sponsors and officials have. Whether we win anything or not, we really ought to take enough time during or after the meet to say "Thanks" to the people responsible for holding the meet.

Second, a good idea. We quote: "It was suggested that each Open or Senior member who could, would take one or more beginners under his wing. This would mean that all new members, regardless of age, would have some personal attention and help with his modeling problems, whether they be building, flying, or transportation to and from the fields."

• • •

Speaking of good ideas for clubs and club activities, Joe Brown, Kokomo (Indiana) Knights of the Round Circle, tells us the club has recently purchased a pair of giant trophies for combat and rat racing. For club competition but called "perpetual"—each time there's a new winner, the old winner turns the trophy over to him. To keep one of them permanently, a fellow's got to win it four times in a row.

A good many clubs offer perpetual awards to members on an annual basis, usually on a point system—winning or placing in open meets, setting national or club records, attendance at contests and meetings and similar individual demonstrations of flying ability, interest and club spirit.

Some offer runner-up trophies, others special awards based on committee decisions. Some we've heard of include, Best Original Design of the Year, Most Unorthodox Design, Outstanding Member, and the like. Funniest was a special award of the New Jersey Thunderbirds. "The First Annual Geritol Tired Blood Award" consisting of a magnificent wooden base into which was set a bottle of the well-known tonic, surmounted by a small model airplane. The wings drooped, the body drooped, the stab and rudder drooped, the propeller drooped—even the cylinder of the dummy engine drooped. It had tired blood!

• • •

A few items from the trade: Top Flite *Jr. Flite Streak*, for .15 to .25 engines. George Aldrich designed both the Jr. and its famous "daddy." Junior has a span of 31 inches.

Ambroid Liquid Cement has a new spreader cap on the 1-3/4 and 4-ounce tubes. Use like a brush for spreading on large areas as in laminating two sheets together, or you can use the edge to get into corners, etc., 'tis said.

Barnstormer Mark 2 (Paul K. Guillow, Inc.) is a new movable flap version of the well known stunter. For .19 to .36 engines. Also the *RC Explorer*, a 56-inch span RC trainer for .15 to .25 engines. Rudder-only, intermediate or multi gear can be installed. Designed by Lew Andrews. . . .

Victor Stanzel & Co. announce the *Electromic Flash*. Electric motor in flashlight type "handle" with flexible shaft out through tubular flexible "control line" driving prop. Looks good for occupying the little ones while daddy's busy flying.

For $129.95 you'll soon be able to buy a completely finished *Astro Hog* (World Engines). Covered and doped, with engine, tank, wheels, and control linkage for rudder, elevator and ailerons. Designed for Bonner servos, which you buy and install yourself along with the receiving gear of your choice. Shipped by truck. What next?

From Carl Goldberg Models, the *Swordsman 18*, an 18 in., all balsa profile control line model for .02 to .049 engines. And Enterprise's *Something Special*, a 27 in. job for .15 to .35's, sport ukie on team racer lines, featuring two-sectioned wing (spanwise) with hollowed, shaped pieces that butt together; also carved fuselage. *Fokker D-7*, 17-1/2 in. wing and .02 to .074 power.

Fox Manufacturing Company, Fort Smith, Ark. tooling up for an .09. Tank an integral part of the motor, mounting dimensions identical with Fox .19, following company policy of interchangeability wherever possible.

Men and Ships

(*Continued from page 13*)

in it he and Mrs. Lindbergh, on April 20th the following year, made a Los Angeles-New York unofficial record flight in 14 hours 23 minutes flying time with only one stop.

This was only the first of a series of pioneering and route-proving flights they undertook together. On July 29, 1931 they took off from College Point, N.Y., in the Sirius (now Edo float-equipped) on a breathtaking journey to Tokyo—via Canada, Alaska, and the tip of Russia.

First stop was North Haven, Me., where Mrs. Lindbergh said goodbye to her family. On the next leg, to Ottawa, she had her first successful day with operating the radio, and as the flight progressed quickly became a highly proficient operator.

The experts at Ottawa were politely concerned at Lindbergh's choice of route. His method was to rule a straight line on the map between the various route stages, regardless of the terrain beneath and independent of recognized embryo air routes. But over featureless swamp and lake the Sirius carried them, the Cyclone not missing a beat, skirting Hudson Bay, via Churchill to the tiny trading outpost at Baker Lake.

During the next leg to Aklavik, Lindbergh took a few cat-naps while his wife took over the controls, and during one of these spells the motor began to splutter. Lindbergh quickly reached for the fuel cocks and the engine again roared into life. But a glance at the countless tributaries of the vast Mackenzie delta below fully brought home to them the risks of a forced landing so far from civilization. Grey fog banks, cloud and rain, the weird half-light of an Arctic night accompanied them on this part of the flight.

Further adventures on their journey included a hazardous forced descent in fog and two nights on the open sea in the lee of Ketoi Island, North Japan, and the discovery of an intending stowaway on the plane at Osaka, their next stop after reaching Tokyo. Flying across the Yellow Sea to China, they found the Yangtze River in

full spate and volunteered their services to the Flood Relief Commission to survey the flooded areas. And just at the end when their task was almost done, the Sirius was capsized and almost sunk when being hoisted into the Yangtze from the British carrier Hermes.

Saved from the river, the Sirius went to Shanghai on the deck of Hermes, and from there was shipped to Lockheed for repair.

The last great journey in the Sirius started on July 9, 1933, when the pair set off on a flight right round the North Atlantic to survey air routes between the USA and Europe for Pan American. They crossed to Europe via the Northern route –Newfoundland, Greenland, Iceland, the Faeroes and Shetlands, to Copenhagen. Then a tour of Europe, including Stockholm, Leningrad, Moscow, Southampton, Galway, Inverness, Amsterdam, and Geneva, to Lisbon. Finally an exploration of the middle trans-ocean route as far as the Azores, and a successful crossing of the South Atlantic route from Bathurst, East Africa, to Natal, Brazil. Over five months after they started, having flown nearly 30,000 miles, the Lindberghs arrived back at College Point on December 19th.

Two days later Lindbergh presented the plane, fully equipped, to the American Museum of Natural History, where it is still on exhibition.

• • •

The Sirius, altered to Col. Lindbergh's specification and tested in late 1929 and the spring of 1930, was a Model 8 two-place landplane version with a Pratt & Whitney 420 h.p. motor and wood construction, plywood covered. The fuselage was painted black with gold trim lines, and the wings and certain tail surfaces were orange-red. The number 211 used on the famous "Spirit" was retained but with an NR prefix, the registration being carried on the rudder.

With long-range flight plans in mind, Lindbergh ordered extra tankage, mainly in the fuselage, to bring the total fuel load up to 440 gal. for a range of around 3,300 miles. The plane, later dubbed "Tingmissartoq" (in Eskimo "the one who flies like a big bird") spanned 42 ft. 10 in. approximately, was 27 ft. 6 in. long, had a mean chord of 6 ft. 10 in., and a wing area of 285 sq. ft. Empty weight was 2,950 lbs. and full-range loaded weight 6,200 lbs. compared with a normal loaded weight of 4,400 lbs. Company figures for average Sirius performance were: top speed 175 mph; cruising speed 145 mph; climb rate 1,200 ft. p.m.; service ceiling 20,000 ft.

The tone general arrangement drawing shows the plane in slightly cleaned up form with enclosed cockpits, cut-down engine exhausts, and no spinner. For the 1931 flights, floats were added and 300 gallons of fuel stowed therein, enabling a 200 gal. extra fuselage tank to be removed to make more room in the baggage compartment. With the remaining 110 gal., fuselage tank and twin 58 gal. wing tanks, total capacity was up to 526 gal. for the new Cyclone engine fitted, enabling the Colonel always to keep a good fuel reserve in hand on the various legs of the New York-Tokyo flight.

For the 1933 survey flight, a more powerful Wright Cyclone F was installed. giving 710 h.p. and driving a Hamilton Standard c.p. propeller. (Acknowledgements to: U.S.A.F.; Royal Aeronautical Society; Dustin Carter, Esq.; Aero Digest, Aviation, and The Aeroplane; A Chronicle of the Aviation Industry in America; Edo Corporation; The Lindberghs by P. J. O'Brien; North to the Orient and Listen to the Wind, by Anne Morrow Lindbergh.)

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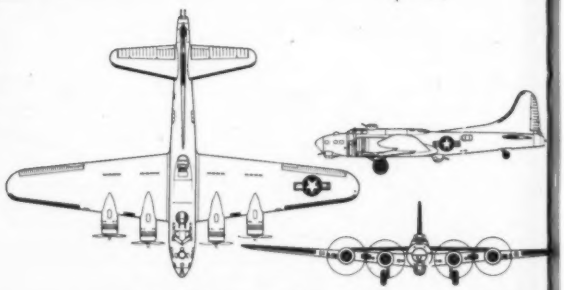

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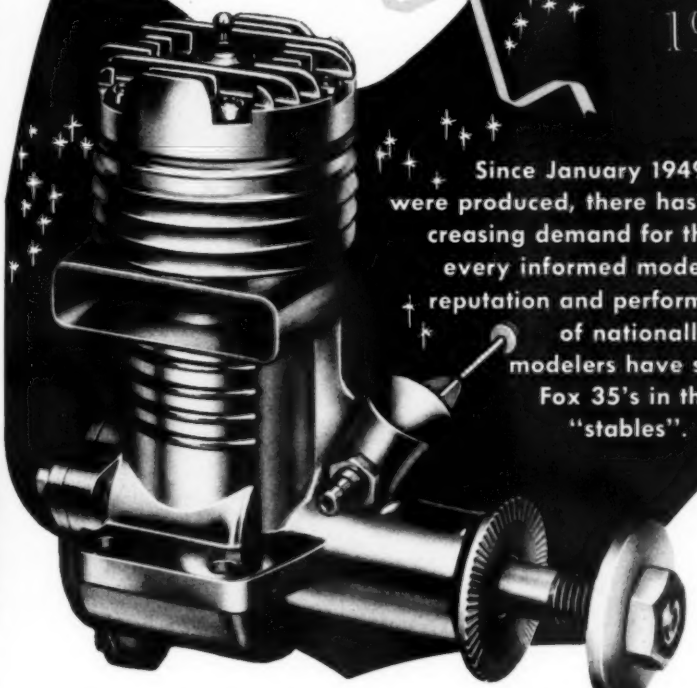
the FOX Anniversary model .....

35

1949 / 1959



Since January 1949, when only 50 Fox 35's were produced, there has been a constantly increasing demand for this model until today every informed modeler knows of its reputation and performance. Hundreds of nationally-known modelers have several Fox 35's in their "stables".

There have been many changes since 1949 with yearly improvements to give it even greater performance.

- Changed from a machine-turned crankpin to a ground pin.
- Changed from a permanent mold casting to the die casting method for more uniform castings.
- Changed from taper thrust to flange washer for positive prop drive.
- Improved the grade of steel in the crankshaft.
- Added bosses underneath cylinder head hold-down screws for less cylinder distortion.
- Developed a superior cylinder finish.
- Rear cover changed from two to three lug design for greater durability.
- Changed from 4 head hold-down screws to six.

Although many of the improvements are not readily apparent they all add up to greater performance and longer life and you may be sure, *the Fox Anniversary Model 35 is the finest Fox ever built.*

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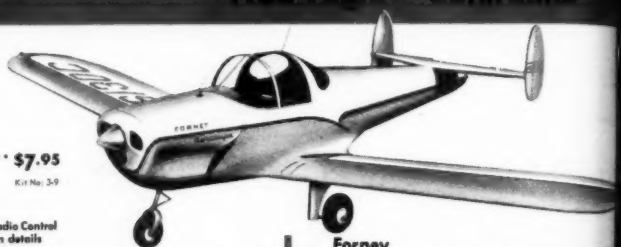
RADIO CONTROL FLYING SCALE

For Radio Control — Free-Flight — Controline



1-1/2" Scale **PIPER** 54" Wingspan —

"COMANCHE"

Newest King Size Model... $7.95

For .065 to .15 Engines — Radio Control
For .09 to .19 Engines — Controline

Kit No: 3-9

Piper Aircraft's latest four-place personal airplane is an ideal design for low wing radio control and controline flying. The kit model is ruggedly designed and adaptable to a number of model engines. Easy to build and fly too!

- Die cut Celluloid Windshield
- Formed Landing Gear
- Hardware
- Tapered Balsa Trailing Edges
- Full Size Plans with both Radio Control and Controline installation details
- Die cut balsa and plywood parts
- Silkspan Covering

"BUSTER"

For Radio Control Pylon Racing - Controline Flying

For .15 to .35 Engines — 3" Scale — 48" Wingspan $9.95

First scale model kit for Radio-Control Pylon Racing, - also for Controline flying. 1/4 size of real 16' wingspan "Buster" racer. Kit No: 3-8

• Operating Wing Flaps
radio or controline actuated

$8.95 Kit No. 3-4

CESSNA "172"

BIG 1½" SCALE — 54" WINGSPAN FOR .09 to .19 ENGINES

• Adjustable Ailerons
for manually setting trim

Here is the latest scale "Cessna" that is a "natural" for radio control. The big proto ship takes-off and lands with "hands-off" control. The model handles just as easy! It's a model builders dream ship!

Radio Control — Free-Flight — PAA-Load

"PIPER CUB J-3"

For .15 to .25 Engines—71" Span—2" Scale
Weight: 4½ lbs. — 700 Sq. in. Wing Area — 14.2 oz. Loading

The "Piper Cub J-3" needs no introduction. Most famous of all light aircraft, it's a natural for R.C. or Free-Flight flying. The six foot span permits the extra R.C. installation that you dream about. This is a rugged, detailed, flight proven design. Full-Size Plan with R.C. installations, Authentic Decals, etc.

$9.95

Army Liaison YL-24 **"HELIOPLANE"**

For .049 to .14 Engines — 39" Wingspan — 1" Scale

With a large prop and full span flaps, the full-scale "Helioplane" can take-off with full load in 300 feet, maintain level flight at 30 m.p.h. Top speed is 150

$3.95

"WACO CABIN"

1½" Scale — 52" Wingspan For .14 to .49 Engines

The 1½" scale "Waco" spans 52". Weight with all radio equipment installed is 4½ lbs. 630 sq. inches wing area. Model is designed for multiple control through compound escapement systems. In flight it is very stable and easily controlled with rudder only type installations. Rudder, elevators, motor and steerable tailwheel may be actuated. Radio equipment is removable as a unit for convenience.

Kit No: 3-6

$9.95

less wheels & wheelpant material

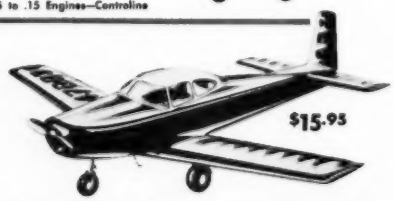
Piper "TRI-PACER"

Four place cabin monoplane with interconnected ailerons and rudder. Powered by 135 or 150 hp. Lycoming Engine. Maximum speed 139 m.p.h.

1½" = 1' Scale—44" Wingspan

For .065 to .099 Engines—Radio Control
.035 to .075 Engines—Free-Flight
.075 to .15 Engines—Controline

$5.95



$15.95

NAVION "Super" 260

- Full Size Plans with Radio Control & Controline Installation Details
- Molded and Embossed Celluloid Canopy
- Vacuum Formed Polystyrene Cowl

2" Scale — 68" Wingspan
6½ Pounds with R.C.
720 sq. in. Wing Area

.29 to .35 Engines Radio Control
.23 to .29 Engines Free-Flight
.29 to .65 Engines Controline

This beautiful scale replica of the famous "Navion" is a fast, rugged and truly different R.C. or Free Flight design, easily adapted to Controline Flying. Thrill to its flashing performance and smooth response. As a free-flight, it will give you experience and confidence in low wing designs. Big, roomy, and well engineered, it will set the pace whenever it's flown. Easy to build!

Forney

"AIRCOUPE"

For Radio Control— Free-Flight— Controline

Kit No: 3-7 1½" Scale .074 to .29 Engines

$6.95

The kit is very complete in true Berkeley tradition with prefabricated wood parts, silkspan, landing gear and hardware, plus the super-detailed plans and full colored authentic decals found only in Berkeley Kits.

AERONCA "C-3"

1½" Scale—54" Wingspan

For .074 to .15 Engines Kit No: 3-5 $5

Available as a 36" span for "½A" Free-Flight, Control as a 54" span for Radio Control, Free-Flight, Control

For .049 to .075 Engines—Radio
.035 to .075 Engines—Free-
.074 to .15 Engines—Con

De Havilland "BEAVER"

1" = 1' Scale—48" Wingspan

• Formed Metal Ring Cowl

FREE-FLIGHT: Contest performance possible. Easy to and an excellent design for less experienced scale

RADIO CONTROL: Recommended for precision flying, two-speed work, shooting landings, etc. Realistic

CONTROLINE: Long moment arm provides full range of on take-offs, landings, and throughout flight. Very

$13.95

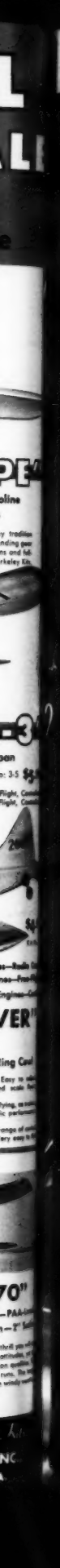
CESSNA "170"

For Radio Control — Free-Flight — PAA-

For .25 to .35 Engines — 72" Span — 2" Scale

Controlling your "Cessna 170" by Radio is a thrill you forget! Perfect in scale, rugged, stable in all attitudes, responsive in control, with good wind penetration qualities, gear location is ideal for extended take-off runs. The than average size makes it easier to control in windy

Since 1938—Leader in Creative Model Aircraft

BERKELEY MODELS INC.

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